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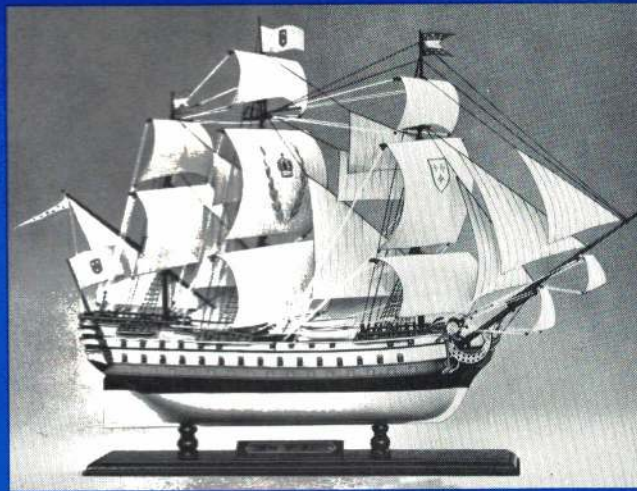
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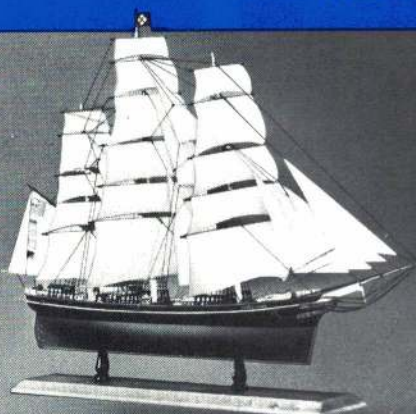
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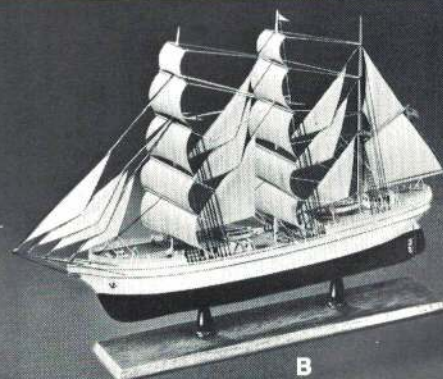
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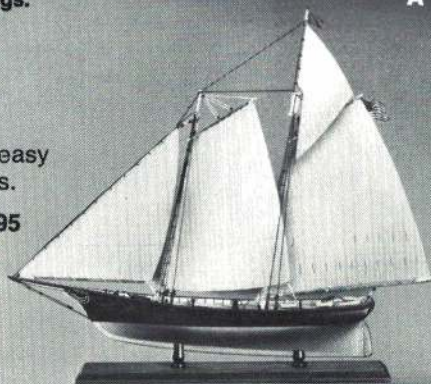
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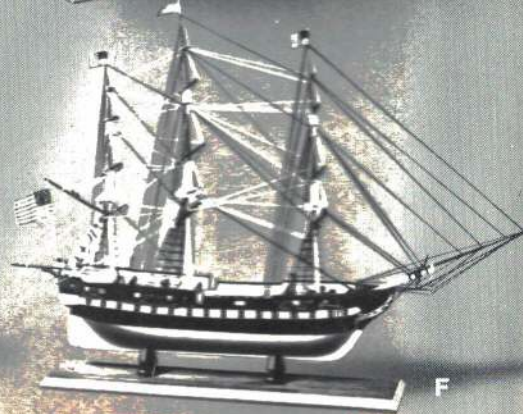
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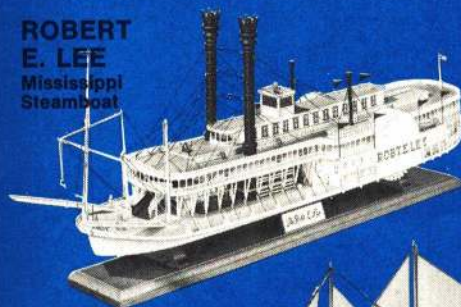
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# Wood Ship Models

The kits that make Authentic Ship Modeling easy!

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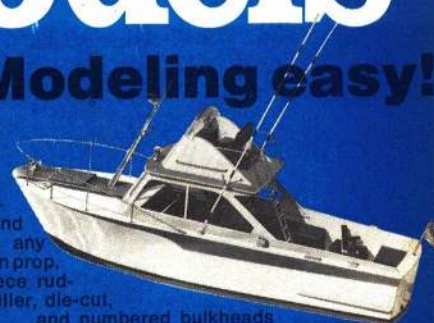


This famous sidewheeler kit includes pre-shaped smoke stacks, carved hull, cast-metal fittings, formed deck-railings, handsome nameplate and display stand, and easy to follow instructions.

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Length 24½"**

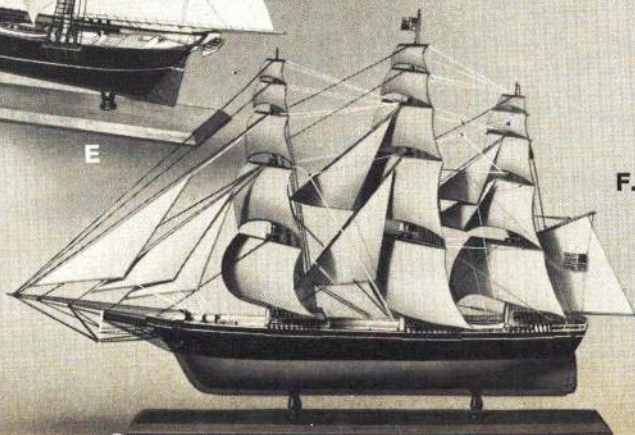
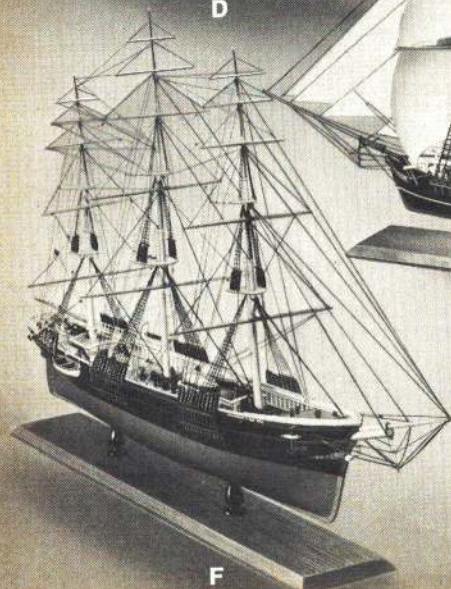
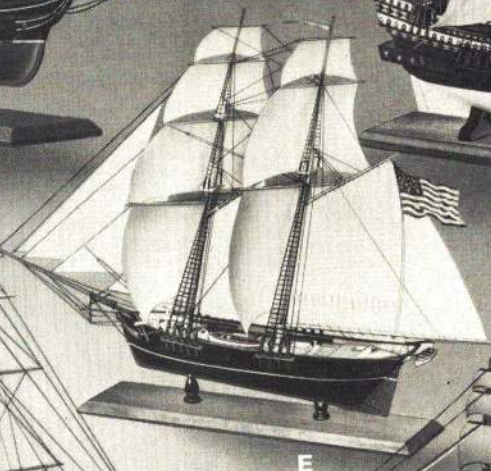
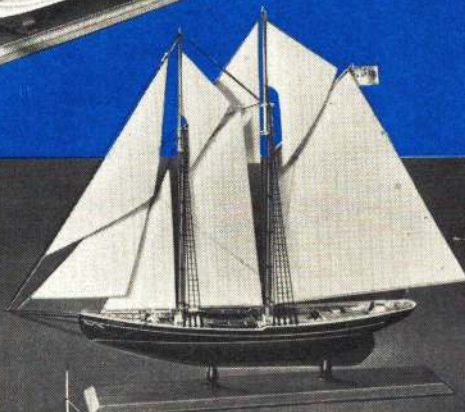
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MODELS INC.**

340 E. Snyder Avenue  
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# AMERICAN aircraft modeler

VOLUME 77, NUMBER 4—OCTOBER 1973

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# CARL GOLDBERG

**"THEY WORK LIKE A FINE SWISS WATCH C G RETRACTS (and) CAN TAKE PLENTY OF HARD USE."**

Walt Moucha, Jr., has made a name for himself as an International class R/C scale modeler. For a man of such skill and talent, only the best is good enough. Here is his opinion of CG Retracts:

Dear Carl: Enclosed are a few pictures of my Waco Meteor. I have been using your retracts

in this ship for some time, and they work like a fine Swiss watch. Still, they can take plenty of hard use. In scale modeling you have to have things working

correct every time, and the Goldberg retracts do the job I want. To sum them up in a few words, they are well made and work to perfection. I know every modeler who uses them will agree with me. For myself and all the other modelers, thanks for the finest retract system to date.

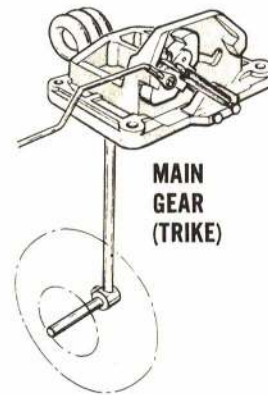
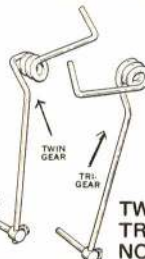
Walt Moucha, Jr.

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Twin Gear set RS2—\$3.00

Tri Gear set RS3—\$4.50



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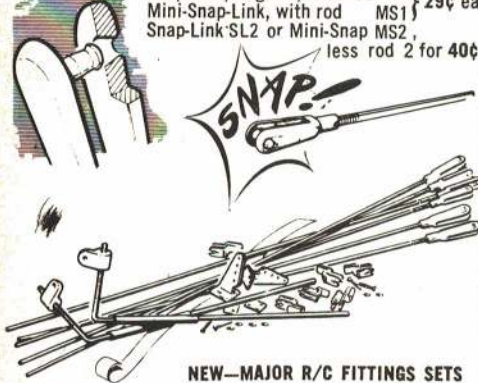
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TWIN GEAR Retracts—RG2—\$14.95  
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Snap-Link, Regular, with rod SL1 } 29¢ ea  
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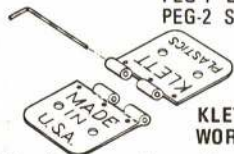
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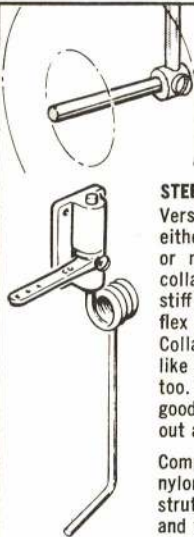
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Versatile — steering arm can be to either side, or slightly up or down, or mounted on bottom with extra collar in slot. Steering arm is nylon, stiff enough for good control, yet can flex under shock to protect servo. Collar is hardened steel—won't strip like brass. Screw is hardened steel, too. You can really torque it and get good grip on music wire strut without a flat.

Complete steerable nose gear with nylon bearing, 5/32" plated music wire strut, extra collar, blind nuts, screws and washers G16N \$2.50.



**NYLON STEERING ARM**  
Hardened steel collar and screw SA1 75¢.

## NYLON BEARING

One-piece design. mounts to firewall without alignment problems. Includes blind nuts, screws and washers N81 75¢.



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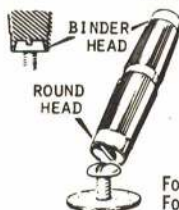


## NYLON REINFORCING TAPE

This nylon reinforcing tape is extremely tough when applied with epoxy around the center when joining wing halves. 2 1/2" wide x 5 ft.—N2 50¢. 3/4" wide x 5 ft. N1 25¢.

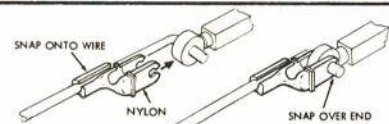


**NEW KLETT SAFETY DRIVER SOCKETS DOWN ON SCREW HEAD — CAN'T SLIP OFF AND DAMAGE YOUR WING!**  
Takes Round Head Screws and Binder Head.



## KLETT SAFETY DRIVER

For 1/4" Nylon Screws SD1 } 98¢ ea  
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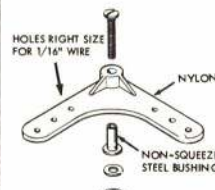


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Quickest, handiest way to secure pushrod wire end to servos, horns, etc. Works on wire 1/4" to 3/4" diameter. SK1 50¢ for 4.

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## GUEST EDITORIAL

# Let's Put Technology Back Into RC Modeling

*Editor's Note: This month's guest editor is Stew Vance, Vice-President of the D.C. Radio Control Club (Washington, D.C.) and Editor of the DCRC Newsletter for the past four and a half years. Having a large distribution, the Newsletter has reached modelers all over the country.*

*The following commentary is an excerpt from the July 1973 DCRC Newsletter regarding the present status of RC and RC Clubs.*

Some of you may recall that in the September Newsletter, I commented upon the fading away of newsletters in RC clubs all over the country. Since that time I have talked and corresponded with a few newsletter editors on this subject and find that they agree with me. They see their clubs as being sport/recreation clubs rather than electronics/aeronautics technical clubs. Virtually all of the clubs are overwhelmingly peopled by members whose entire focus of attention is upon flying and the social aspects thereof. Few are devoted to design of aircraft, development of the electronic aspects of the hobby, and some are even so negative to these original aspects of RC as to be entirely ignorant of even the smallest detail other than how to move the sticks on the transmitter, charge batteries, fuel and adjust engines, etc. They buy ARF craft, already manufactured transmitters (and what's wrong with that?) and learn nothing of the insides of either.

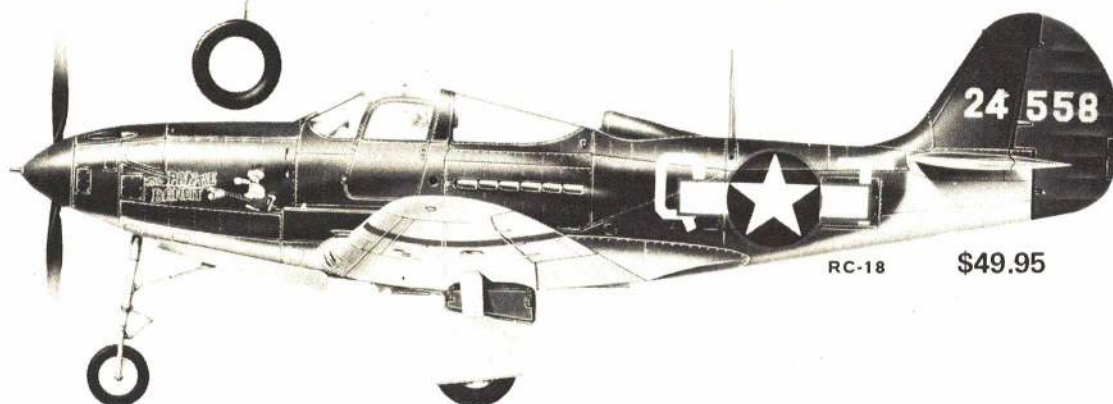
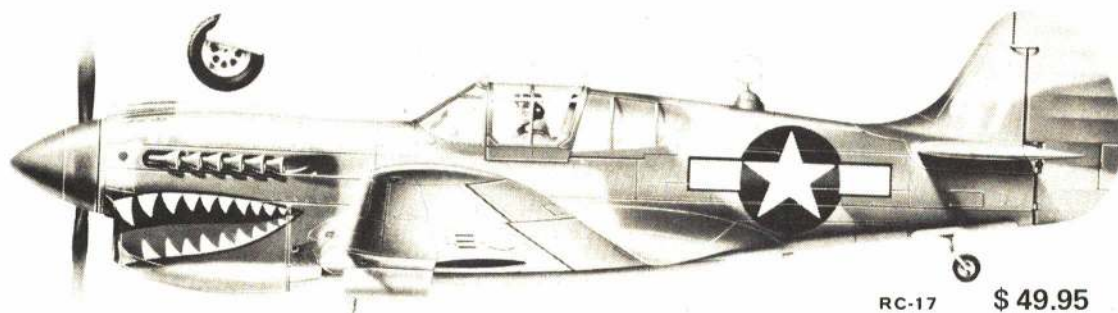
Still, in each club there is a nucleus of technical knowledge. This is essential. Some aerodynamic knowledge to trim and check out aircraft must be there for the club to provide other than a flying field as a service. Hopefully someone in each club knows when to call the doctor for the sick radio gear, if not be the doctor himself. These people are generally cherished and cultivated by the club members not so favored. They are often courted by individual and group. They are essential members. But it is rare when these same people undertake to educate the entire membership (or the

membership of other clubs) through publishing their knowledge. We must not attribute any "trade secret" aspects to this lack of willingness to impart knowledge because it probably is not there. It's just that most individuals do not find writing for the newsletter or the magazines their favorite task. It is hard, and sometimes trying, to write down what you know is not only hard work, but has a tendency to show gaps in one's knowledge. Or, perhaps there is not enough time, or enough encouragement. In any case, technical writing within the club newsletters is getting harder and harder to find.

But...this is the reason the Newsletter is fading away. At least it is fading in its original format—as a technical bulletin to share knowledge. To replace the technical bulletin format we see some newsletters which are making an adaptation to the sport/technical aspect of the hobby. We see some with extensive commentary on contest and pylon racing, and only nominal coverage to anything else. We see newsletters which place heavy emphasis upon the club workings, upon the field doings, and upon the social life within the club. We think these are the way things are going in RC, and the newsletters are reflecting it. We are now in a social/sport atmosphere, and we suspect that we will go much farther along this line before we are through. We have suggested before that we may find RC turning to country club lines with extensive property for social affairs as well as flying miniature aircraft. We may even find the technician in the club transformed into the "Club Pro" with his shop and lessons arranged for the convenience of the members. At the same time there will be members of the club whose knowledge stands out above the "duffer," and whose advice and help is sought as an alternative to the "pro."

So, we have consulted our Crystal ball and read the future "through the glass darkly." Sorry about that.

—Stew Vance



## THEY'LL FOOL YOU, TOO!

TOP FLITE is proud of its stand-off scale R/C models—all three of them . . . because they've fooled a lot of people, including some real pros. There's the P-51 Mustang, the P-40 Warhawk and the latest—the P-39 Airacobra.

Each model looks just like a true scale model. In fact, you'd probably have to use a ruler to tell the difference. What's more, these authentic-looking models deliver the flying performance and the building ease of a sport R/C.

And, like all TOP FLITE kits, each has exciting new features and time-saving design features.

So, if you want to fool your friends, now you can choose from *three* great stand-off scales. Prices start at \$45.00. Stop by your dealer and see these fantastic model kits . . . from TOP FLITE, of course.



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Wing Span 60"  
Eng. .40 to .60



# Modeler Mail

## Flying Saucer

I've been building and flying model airplanes for some 5 or 6 years. The kits are generally easy to build and inexpensive. But about a year ago I started building gliders from the leftover pieces that most people throw away. The gliders range in wingspan from 1 in. to 24 in.

I like making my creations, especially when they *all* fly. Some better than others, but that's a different story. I use no secrets. I just sit down and start cutting, gluing and papering. They take about 15 to 45 minutes to build, and can be flown the next day! Just a little clay here, and a little there, and *presto*—a flying glider! Once I built a glider that flew equally well backwards as it did forwards!

Now I'm building my own U-control creations. I have one design which is 12 in. in diameter. Yep, it's a flying circle. It's powered by a Cox 049 Babe Bee, equipped with a Cox thimble drome triple-beads prop. The plane itself is constructed from solid 1 x 4 x 12" balsa wood. The three pieces were epoxied together and then a saber-saw with a sharp scroller blade and a splinter-fill attachment is used to get a roughly-round wing. The fuselage is carved into shape with a saber-saw and sandpaper. The tail pieces are cut and sanded into shape. Then the wing is slowly sanded into one big airfoil shape. (symmetrical). Everything is glued on and doped with three coats of clear and three coats of color. Sanding between coats and using masking tape for stripes (so the dope won't mix). Landing gear and pilot should be added after first color painting and before second. The stabilizer is cut off the wing and the hinges and the control are put into place. The hinges are doped also. The bellcrank should be put in now, but I haven't done it because I don't know where it should be placed—left or right of center? In front of in back of or on top of the balance point? Where should the balance point be? How far back from the leading edge? Should weight be added to the opposite wing tip? If so how much and where?

Now that the plane is done I've really got a dumb question. In flying U-control when one proceeds to do a loop by giving full-up wouldn't the lines

cross? Wouldn't you lose temporary control until you turn the control handle over to uncross them? And then wouldn't you not only lose control; isn't it dangerous? It was never mentioned in Howard C. Mottin's, *Getting Started in Control Line*.

One thing else about the airplane. It's big and heavy for the engine, but I can't see putting on a hot 60 just for a Sunday afternoon flying. I like slow-moving and easy-to-control planes—not hot-rod aces where a novice like me would totally destroy one's investment.

Eldon Bingham  
Pleasanton, Calif.

*I believe your model flying saucer will fly as you had hoped, slow and easy, if the wing is thick enough. However, as I read the dimensions of the aircraft, I am afraid it might be a bit fast. Speed will depend on the choice of engine size or propeller used. The flying saucer configuration is quite stable and so flying with a low-pitch but large diameter propeller gives you the desired flying characteristics. The best balance point for almost any kind of aircraft is the range between 1/4 and 1/3 of the wing chord on your aircraft. Measure this distance from the nose to the tail and I believe it will fall between the pilot's position and the edge of the blue color trim. The further forward the balance position is located, the less sensitive the model will be to the elevator control. In order to help the model stay out on the lines, I suggest that you add two 25 cents pieces to the outboard wing tip, more for a windy day. The landing gear should be positioned directly under the engine.*

*When flying control line with steel lines (braided or solid), the twisting of the lines due to flying loops does not introduce a large control problem. However, twisting of fiber lines is always a problem. Experienced stunt fliers always plan their flights so that the maneuvers unwind the lines before the twists become too many.*

—Editor

## Feelings on safety

Several members of our club, Township of Ocean Pro Swingers (T.O.P.S.), have recently noticed comments about safety thongs in both *American Aircraft Modeler* and *AMA's Competition Newsletter*. The issue seems to be on negating or making optional the use of safety thongs while flying control line, especially if the pull test is under 55 lb.

Since the matter has been proposed as a change to the rulebook (*Competition Newsletter*, April 1973, control line contest board matters CL-73-19 and CL-73-20), we as a control line club must protest this change. We have been able to operate with safety thongs as they are presently required in the rulebook, and can find no fault with them. We do not believe that the polling of

competition fliers or experts as to whether or not the handle could be pulled from one's hand is relevant. We do feel that basic safety is the issue and if flying with a safety thong can help teach Junior members safety, then it is just as important as learning about glues, paints, prop nuts and overhead wires. We do not feel that it should be an optional item, but that it be required as presently written in the rulebook.

Joseph A. DeMarco, Secy.,  
T.O.P.S.  
Oceanport, N.J.

## Variable pitch propeller source

In response to Dennis Ladino's letter in the August issue about a variable pitch propeller, I looked back through my magazines. I found an ad for one run by a company named Elconis (53-56 65th Place, Maspeth, L.I., New York 11378).

It is said to be 11 in. dia. capable of seven in. full pitch, to neutral, to reverse. It is operated by a separate servo. If they still make it, it might be worth the money (\$45).

Dan Margolien  
Lexington, Mass.

## Comment on 'Problem'

Your editorial, "It's A Growing Problem," (July 1973 *AAM*) was quite similar to one I saw written back in 1953 or 54 when U-Control was in its heyday, and when the modeling industry was doing what they are doing right now—killing the hobby for the mass, with the mad rush for the dollar. There would be no shortages—if the hobby operated within the boundaries of good business sense, instead of trying to supply more and more to mass merchandisers (discounters) who are all buying too many mistakes, creating too many stockpiles of merchandise which will go unpaid for, and which will probably be dumped when the trend gets started. Just too many channels wanting merchandise, which may or may not sell at any price.

The comment concerning radio manufacturers not wanting to increase their facilities bears out my thinking. Most of these people have had the love for the modeling hobby many years. They have seen the up and down, boom and bust. Several can remember the leftovers of another era. When the model manufacturer started selling every modeler who owned two planes, wholesale, when every modeler went into the hobby business at cut price, they took away the fun of shopping, talking, seeing what the hobby dealers had in stock, and bought for his friendship and good will for their modeling circle.

Shortages we do have—good business-minded men to run hobby shops. These guys had so much sense they went into a more competitive business called crafts, but made a profit because they dealt with business people. No one cares to compete with low prices, unless he's very hungry.

Eldon C. Wilson  
Wilson's  
San Angelo, Tex.



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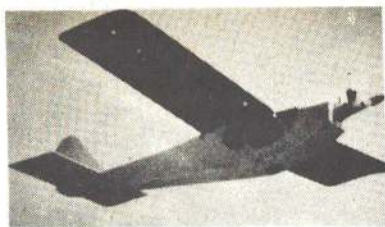
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"HONKER" just proves the point that if you design an airplane that's ugly enough to fly well, you can also sell it like crazy.

"Honker" has a 36" wing-span, takes an .049 engine, and 1 to 3 channel radios. Builds in one evening because the wing is pre-built (all balsa) and everything else is so easy to put together that you could almost call it an A-R-F.



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**Series III**

**HOBBY LOBBY 5**  
**Digital Proportional \$209**

• Improved Airborne Battery pack with ONE-CELL-OUT flight capability

• Only 11½ oz. airborne weight

Please call or write for FREE brochure, or, better yet just order the radio—they're in stock.

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And, the Super Torque has features that its competitors don't have:

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- Brand "P" starter \$29.95
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**HOBBY LOBBY**  
**\$24.95**

Super Torque Planetary gears

High speed 12 volt motor

Abrasion resistant wire

Full length switch bar

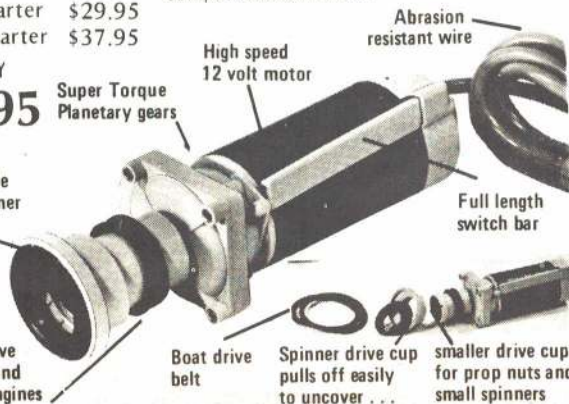
Easily replaceable "O-ring" in spinner drive cup

V-belt drive for boat and copter engines

Boat drive belt

Spinner drive cup pulls off easily to uncover ...

smaller drive cup for prop nuts and small spinners



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The READY BIRD 23 is an almost fully assembled Lanier airplane with an EK Products "Little Red Brick" 3 Channel digital proportional system FULLY INSTALLED, a Fox 25RC engine INSTALLED, and pushrods, wheels, fuel tank ... EVERYTHING ... FULLY INSTALLED AND ACTUALLY READY FOR YOU TO FLY!!!



Aside from the fact that the READY BIRD 23 is an ideal way for a lazy guy to jump right into multi-channel RC flying, there are several other reasons that this totally ready to go plane is ideal for beginners and sport flyers:

### ★ THE EXPERIENCED RCer GAMBIT

You are an experienced RCer, so everyone in your town comes to you and tries to get you to do everything for him because "I just don't know as much about this RC hobby as you do." You can now get this pest off your back by telling him that he can spend \$199 and get a COMPLETELY READY-TO-FLY READY BIRD 23 sent to him real quickly by Hobby Lobby.

I think that this READY BIRD 23 will be the greatest boon to the patient and helpful experienced RCers around the country since the digital propo relieved them of the job of tinkering around with everybody's reed outfits.

### ★ THE BEGINNER IN THE BOONDOCKS

Maybe you are stuck out in some place as remote as Brentwood, Tennessee, and there is NO ONE who knows anything about RC at all where you are. Well, you can buy all the books about this hobby, but nothing helps as much as a good LOOK at a ready-for-flight RC plane. The READY BIRD 23 is as ready-for-flight as anything you'll ever see.

### ★ THE LAZY BUM PRINCIPLE

You want to fly RC, but nothing quite as simple as the Testors or Mattell single channel planes, but you're just too lazy to build a fancy multi channel ship...Our READY BIRD 23 is just the thing for you, you lazy bum.

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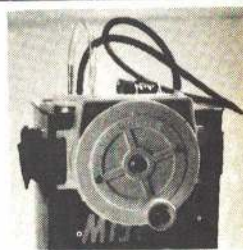
CALL US FOR FAST C.O.D. or CREDIT CARD SHIPMENTS

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### NEW! Southern R/C Products

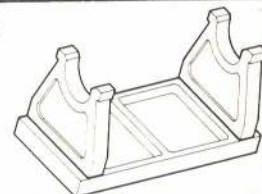
"6-SHOOTER" FUEL PUMP \$9.95

I don't know who thought this up but the mechanical idea used in this fuel pump is danged clever—I won't tell you how it works—you'll just have to buy one to find out. Hand operated rotary pump. Twenty turns, twenty seconds, and your twelve ounce tank is full.



### NEW! Robart SUPER STAND \$3.98

A simple, inexpensive stand that's handy for holding a fuselage during construction or painting, or out at the flying field. Has built-in tray area.



TRY US OUT: A. B. did:

"I receive my orders from you in just one week. Considering today's slow mail service— you ship super fast. Don't slow down!" A.B., North Adams, Mass.

NOTE: We actually use the faster United Parcel Service far more than we use the Postal Service.

# NEW! HOBBY LOBBY Volume II ILLUSTRATED CATALOG \$2.00

Our Volume 2 catalog has more items, more pictures, and better pictures and descriptions of R/C and control-line stuff than we've seen in any other catalog.

We had a lot of guys tell us that our previous catalog was well worth the two bucks it cost them. Volume 2 is even better.

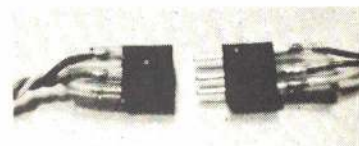


## NEW! SILKSPUN COVERITE 38" x 54" \$5.20



Silkspun coverite is a spun polyester fabric with a very high tensile strength and a smooth paintable surface. To this is bonded a heat activated adhesive. *This stuff is as easy to apply as Mono-kote, but then you dope it to get the more realistic finish of a fabric and dope job.*

## NEW! W. S. Dean's Company DEANS 3 PIN CONNECTOR SET 90¢



Many radio manufacturers use Deans 3 pin connectors and now we've got them for replacements. Gold plated for good conductivity. We also carry Deans 4 pin connector sets (95¢), 6 pin (\$1.05), 8 pin (\$1.15).

## SAVE \$\$ ON THESE MATCHED COMBINATIONS

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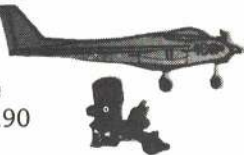
460 Foam A-R-F

52" Span, 4 channels

and  
Fox 36 R/C Engine

Total list value \$49.90

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and  
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and  
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50" span, 2, 3, or 4 channels  
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71" Span,  
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### Ace UPSTART 1/2 A Racer

34" span, hot  
2 channel and  
Cox Tee Dee .049  
Engine

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### Ace ALL STAR Biplane

34" span, .049-.15 engine,  
1 to 3 channel

and  
Cox Medallion .09 RC Engine

Total list value \$38.15

SALE \$28.00



### Ace 2T KIT

50" span, stable,  
1 or 2 channel  
and

Cox Golden Bee .049 Engine

Total list value \$22.65

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### ACE HIGH Glider

70" span, 1 or 2  
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Cox Babe Bee .049 Engine

Total list value \$21.20

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## 'ALMOST READY-TO-FLY' COMBINATIONS

### Lanier SPRINT 25

and  
McCoy 19 R/C Engine

Total list value \$65.90

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### Canyon SCHWEIZER 1-26

(all foam A-R-F glider)

and

D&R Power Pod

and  
Cox T.D. .049 Engine

Total list value \$48.55

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### Canyon's new "U-2"

(all foam powered  
glider)

and  
Cox Medallion .09 RC Engine

Total list value \$49.15

SALE \$35.00



### Midwest CESSNA All Foam

CARDINAL A-R-F

and  
Cox Medallion .15 R/C  
Engine

Total list value \$40.45

SALE \$28.00



### World Engines

HALF DIAMOND

(all foam "disposable"  
ARF-)

and  
McCoy 35 R/C Engine

Total list value \$44.98

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TRY US OUT: C. O. did: "Thanks for your quick, careful service. I was expecting 3 weeks but 8 days!! Fantastic!! C.O., Magnolia, N.J."



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## MODEL WORLD

# THE RC SPORT THAT WENT UNDERGROUND

RC CARS, ALIVE AND WELL. / by J. R. Blanchfield, Jr.

The young woman inquired about the strange smell, but her friend's attention was glued to the orange car. Indeed the scent was in the air—as it usually is on Sundays except that this day it was much stronger. Perhaps the out-of-town crowd was using more exotic blends of fuel than the local racers, or perhaps it was just the presence of twice the usual number of RC cars. At any rate, the fumes from the burned alcohol, nitro, and castor oil were lingering and, in a strange way, enhanced the drama of the scene.

It was the season's first Series 73 East race and the weatherman had accurately forecasted a cold, wet weekend. Nevertheless, teams had traveled from as far away as Massachusetts to compete in the April 8 opener held in a suburb of Washington, D.C. Earlier in the spring, a race in Indianapolis drew 45 entries.

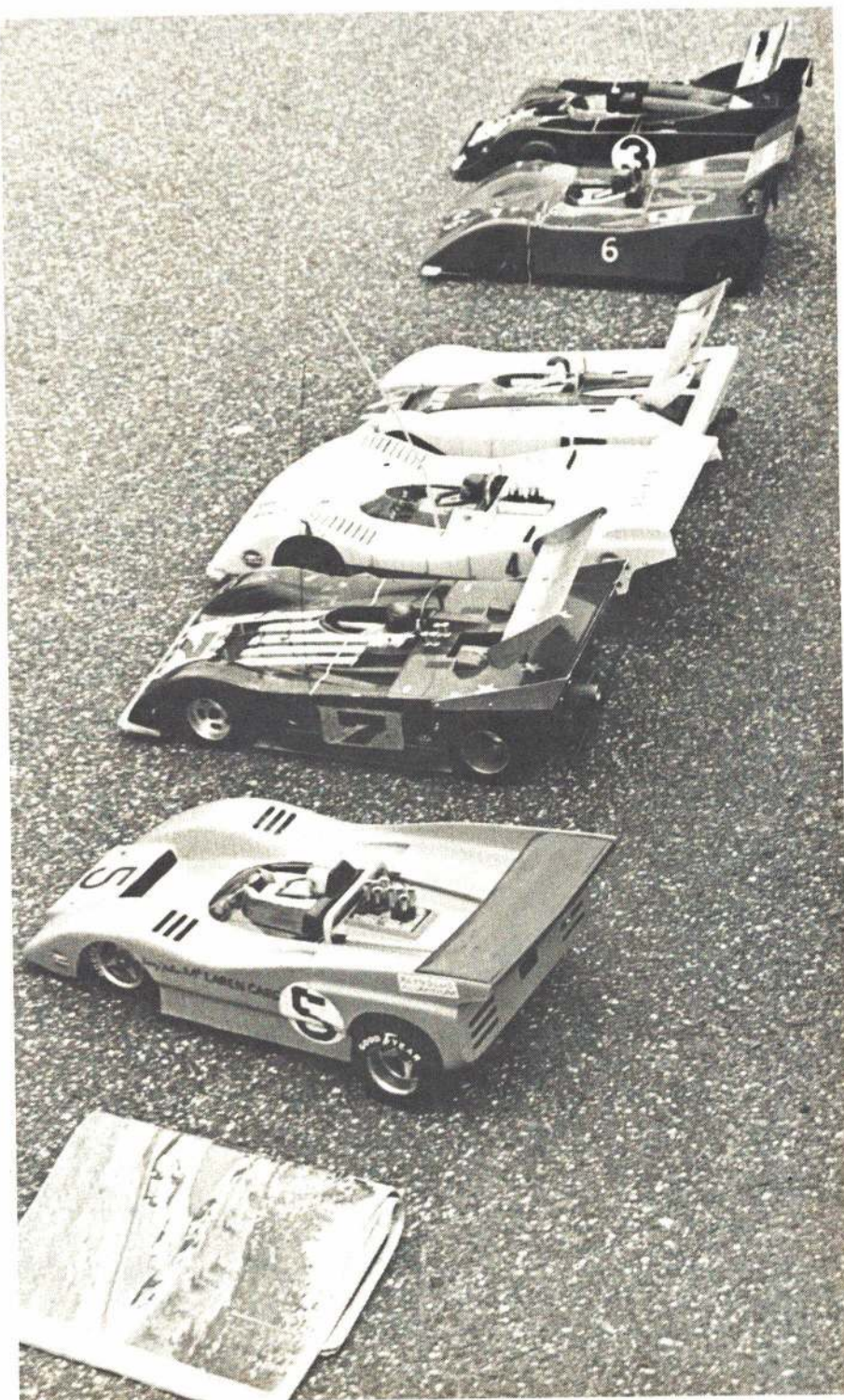
Should these turnouts be interpreted as an indication that RC car racing is a healthy and active sport? The answer is yes.

Organized RC car racing takes place in most areas of the U.S. The national organization, Radio Operated Auto Racing (ROAR), sanctions several separate series of events in various geographical areas around the country. Race locations are chosen within reasonable driving distances of each other so that individuals and teams can travel the circuit and compete for points toward each series' yearly championship. A typical series includes eight races spread over a seven-month period.

ROAR also sanctions a national race each year. Contestants from all parts of the country usually enter this event which is not related to any of the various series races. Additional racing takes place on the club level. Races are scheduled at regular intervals during the season with points being accumulated toward club championships. Clubs also hold special events such as endurance races and demonstration races for promotional purposes. It can be a busy season for an ambitious person or team.

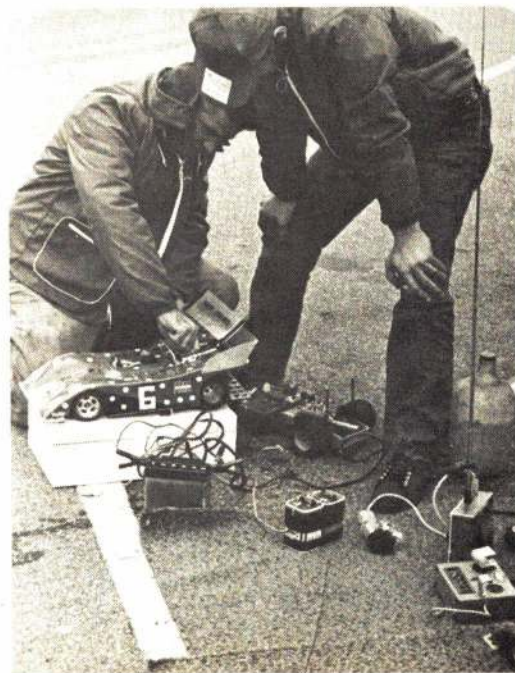
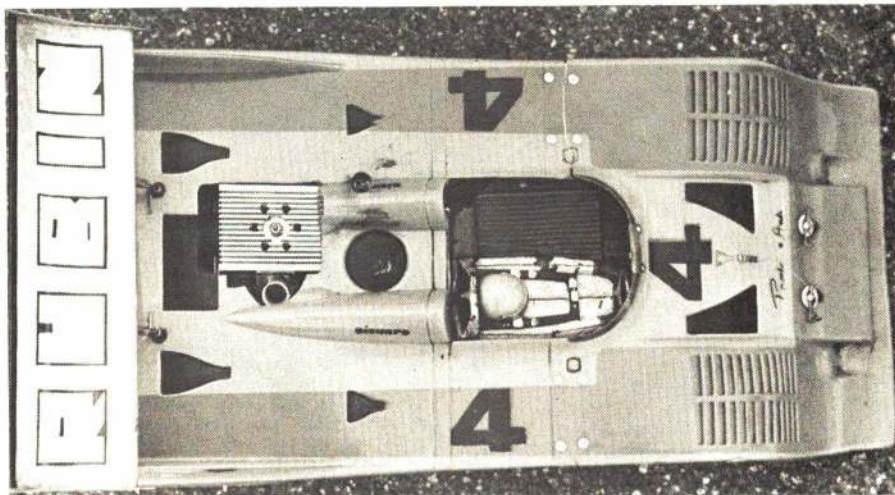
The backbone of RC car racing is the ROAR organization. In addition to sanctioning races, ROAR publishes race procedures, rules, car specifications, a monthly newsletter, and can also provide liability insurance for its members. (Write to ROAR, c/o Roy Moody, President, 755 Ash St., Flossmoor, Ill. 60422.)

*(Continued on page 104)*





Opposite page: Some of the Concours entries. Bill Rattey's car, No. 5, was selected because of realism and workmanship. Above: The moment of truth—the qualifying heat races. Above right: Backpacking anyone? This is Al Bean's approach to what to do with the radio. Right: Phil Rubin's clean, powerful No. 4. He finished second in Expert class. Below: The winners: left to right, Bill Rattey—Concours, Peter Fusco—Amateur, and Eric Hahn—Expert. Below right: Some last-minute adjustments are made in the pit area.



# ON THE SCENE

## THE TIEN MU FLIERS

LARRY HOFFMAN

The morning of March 12 in the city of Taipei dawned on a day filled with glum, threatening clouds after a night of steady monsoon rains. Typical of this time of year, the weather threatened to wash out the first of its type model plane contest, the Tien Mu Fliers RC Model Airplane Club's "Fun Fly." Luck prevailed, however, and by late morning blue sky peeped through the grey and the afternoon warmed up to a weak sun.

The TMF RC Model Airplane Club is the only AMA chartered club in the Republic of China and is one of two known organized modeling clubs in the country. Membership is 26 at present and consists mostly of Americans with four Chinese members. As a result of the contest it is hoped more Chinese fliers will be encouraged to join and share in the fun.

The contest was held at the club's flying field on the outskirts of Taipei City. It is borrowed land that has been leveled and oiled to form an L shaped runway about 250 ft. to a leg. Surrounded by rice paddies, a misplaced landing can mean a pretty wet bird as the fields are flooded this time of year—just one of the minor perils of flying in Formosa.

*(Continued on page 108)*



(1) Mustang by W. T. Chen took first place in Pattern. (2) Mr. Kuo's Japanese model before takeoff. (3) Engine trouble prevented Mrs. Pam from flying this time. (4) Capt. Y.J. Yang (CAF) and club member prepare his original design for flight. (5) Dave Eby's model lifts off for a demo. (6) Wayne Newell makes adjustment on his Falcon 56. (7) Club President Ken Kennedy, CD Bob Stamm and interpreter, K. S. Tsao, start the contest. (8) C. T. Chen tinkers with his "Wildcat" pre-flight.



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 EASY INSTALLATION  
 Pkg. of 6 \$1.10  
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**SMALL SERVO**  
 Natural Rubber  
**GROMMETS**  
 20 Pieces **59¢**

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 The up-to-date way to fasten wings to fuselage. "No Noise" Nylon bolts and Nylon threaded blocks.  
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**Strip Aileron Horn Wire CONNECTORS—AH79**  
 These natural nylon fittings simplify servo link hook-ups  
**NO NOISE**  
 Each set contains 2 Dura-Collars, 2 slot head set screws, 2 horn connectors  
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**AILERON HORN WIRES LB89**  
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**NOISELESS—RELIABLE FREE ACTION**  
 Set of 2 horn wires and 2 mounted bearings  
**LB89 ..... 89¢**

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 LANDING GEAR FASTENERS  
 Light—Strong—STEEL  
 12 Pieces **ONLY 25¢**

**RIGGING COUPLERS**  
 FOR KWIK LINKS  
 THREAD SIZE 2.56; 1/32 EYE  
**RC-30 2 FOR 30¢**

**Complete . . . fully adjustable . . . can be used on any high, mid or low wing plane.**

**NO NOISE!**

**strip aileron linkage hook-up**

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**steerable nose gear**  
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 quality . . . durable nylon nose gear blocks heavy duty steering arm  
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**NOSE GEAR 5/32" WIRE N-W-75 75¢**

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 1 FLEXIBLE STEEL AIRCRAFT CABLE THREADED COUPLER BOTH ENDS  
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 1 NYLON SLEEVE

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**\*Package includes all equipment necessary for immediate operation. All American made!**

Contains: Helicopter, Landing Gear, Rotors, Rotor Assembly, Cox 020 Engine with Fuel Tank and Propeller, Filler hose and Instructions. Stock #: 2003

### **ALSO ACCESSORY PACKAGE 4021 FLIGHT KIT**

\*Contents: 1½ volt Everready Starting Battery, Glow Head Clip and Wires, ½ Pint Glow Fuel, Filler Cap and Wrench.

**2003 \$19.95p.p.** see your  
dealer  
**4021 \$4.25p.p.** first

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## SPINKS ACROMASTER

Engines/ .21 to .40 disp.  
Radio/ Full-house 4  
channel system.

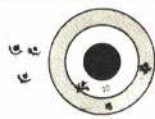
Wing span/ 54"  
wing cores.

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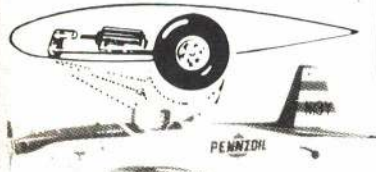
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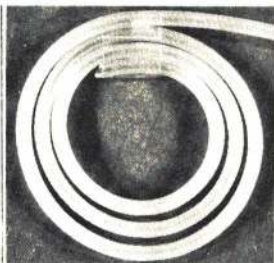
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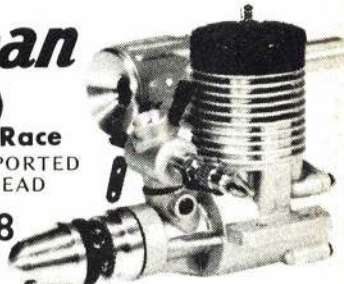
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# Uplift

## STEPS IN THE RIGHT DIRECTION: EASY WAYS TO PROMOTE MODELING. / by Jerry Farr

**Editor's Note:** This article by Jerry Farr of the Key City Prop Twisters demonstrates some of the ways in which any club can promote modeling. Why not look into doing something like this yourself?

In 1969 the Key City Prop Twisters' Board of Directors decided to acquire some of the fliers in the Abilene area and attempt to change the general public's "toy" image of model airplane flying.

We asked our Chamber of Commerce for suggestions. They helped name our club. Abilene is the "Key City" of West Texas and the visitors committee and conventions are always anxious to help anyone that brings visitors to town. They are a great help with the news media. Our Chamber went to the Mayor's office and helped to get passed a "Model Aviation Days" proclamation for our annual contest.

Television and newspaper coverage of these events can really improve your image. Television talk shows and news shows, for example, are always on the lookout for something new and different for their viewers. By contacting the program directors of our two stations, we were able to arrange guest appearances on each of the channels. They both plan to have us back about every six months.

TV sports directors are also cooperative. They always run a little short on Mondays and will show home competitions and results of victorious out of town contests. Last summer we had an out of town winning streak (about five weeks) and one of our TV sportscasters ad-libbed three minutes on "how good we must be."

(Continued on page 86)



(2)

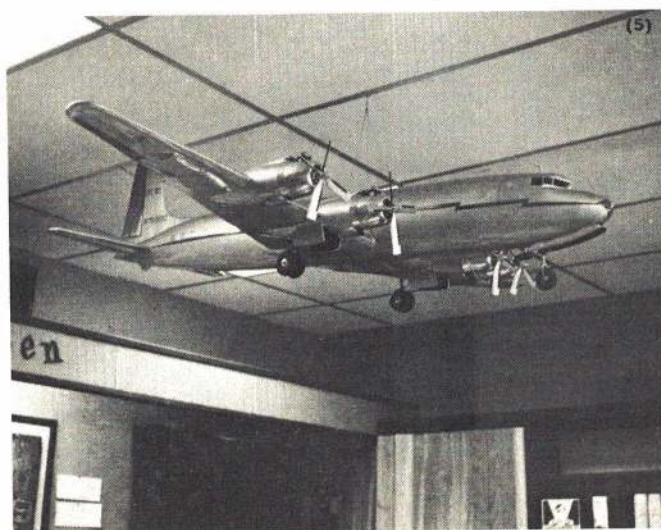


(3)

(1) An AMA District III meeting with Mel Reese, Abilene Parks Dept., as a guest. (2) One result of their efforts—a site built by the City Parks Dept. for modelers. (3) Cooperation. A City Parks employee helps in one of the Delta Dart programs. (4) A good Delta Dart workshop is low in cost and will increase good will. (5) A DC-7. One good example of how models can be displayed in a shopping center. (6) Ed Thomas with his stunter. Always have modelers ready to answer questions.



(4)



(5)



(6)

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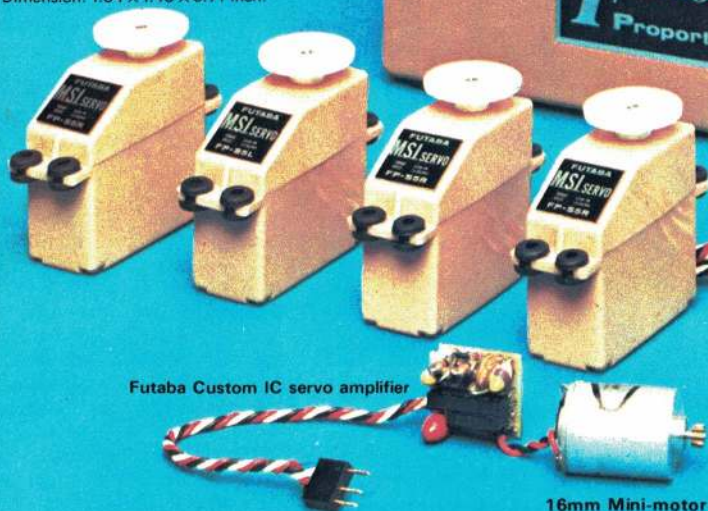
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The BA-606 monolithic IC has 2 PNP and 2 NPN type high output (500 mA) transistors, 4 diodes and 4 resistors—a total of 12 parts.

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# MYSTERY MODEL



This model is tough enough to withstand the hard knocks on a very small field.

Calling all Tenderfeet! Here's your chance to build a model airplane that will surprise your parents and fly higher than any model the kids in your neighborhood have ever seen. And you can build it by yourself in one hour out of four pieces of balsa wood, and fly it dozens of times in an afternoon.

Yes, you are saying, but model airplanes tear up easily. You've seen too many plastic models wrecked on the first flight on Christmas morning. Well, the American Hawk Mystery Model can really take it. Our test model, for example, has rammed the side of a car and flown into a farmer's cow. The only damage was a dented Volkswagen and a cow scared out of a year's growth!

What's the "mystery" all about in the model's name? Show it to any grown-up modeler and he'll probably say, "That thing will never fly!" Then watch him change his mind when you fire up the engine and let your ship go. Are you interested? Come along for the first flight and see what *real* model flying is all about.

You have just completed your American Hawk and decided to let your two best friends come along for the first flight—and your little brother to carry the batteries and fuel. There is a good-size field near your house where they are going to build a subdivision. It has a few trees and a fence, but never mind. With everyone helping, you tie the wing onto the fuselage with a couple of rubber bands. It is held firmly, but still can be shifted back or forth if need be.

Which way is the wind blowing? Your little brother throws up a handful of grass and you watch it come down. Since the model will drift with the wind just like a stick floating with the current downstream, you walk toward the wind until you are near one edge of the field. Now when the wind drifts your model, it will still be on the field when it comes down.

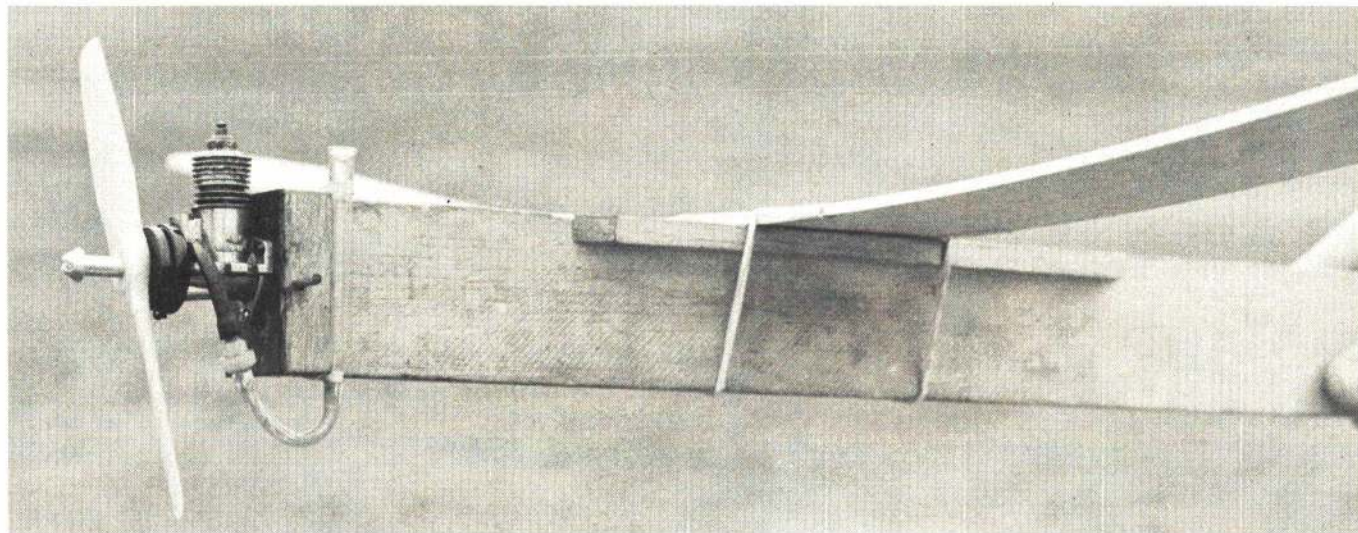
Your Cox Babe Bee is an old one you bought for a dollar out of a wrecked plastic model, but it starts easily. To keep down the power for the test flights, you have the propeller put on backwards (the front side of the propeller facing the engine). With a half tank of fuel and the battery clip connected, you wind back the spring starter. The engine starts the first flip and you "rich up" the needle valve until it is running very slowly. Holding your American Hawk like a spear, you run into the wind and let it go. Slowly it puts its nose up and begins to climb in lazy big circles. Higher and higher it cruises overhead. Your little brother and your friends are running around, yelling, and pointing up in the sky. "Look at it fly!"

Suddenly the faraway buzzing of the engine stops. The model begins to come

*Plans on page 25*

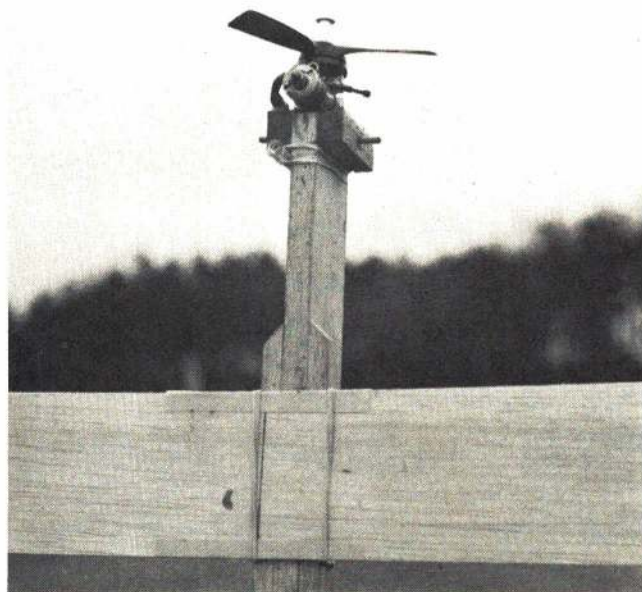
*Text continued on page 96*

## THE UGLIEST FREE-FLIGHT. / by John Krickel



Above: For very small fields (like school playgrounds), use an eye dropper for a fuel tank to reduce the engine run. Right: Use a peanut butter jar to mark off the beautiful round wing tip outline. Bottom left: The line across the wing is its centerline. Notice that it has been moved off-center to control the turn. Bottom right: It may be the world's ugliest model, but here it goes for another beautiful flight.

*Photos by Johnny Krickel*





# HOBBY

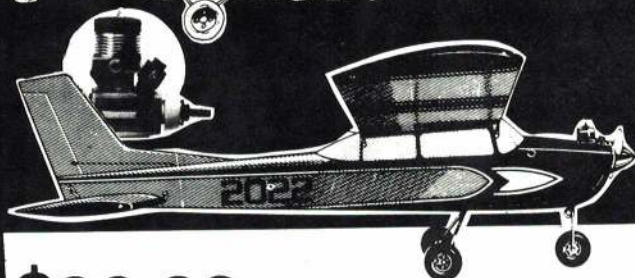
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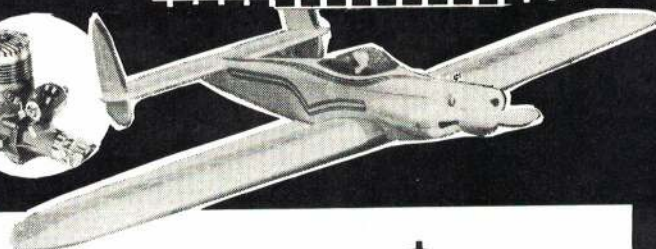


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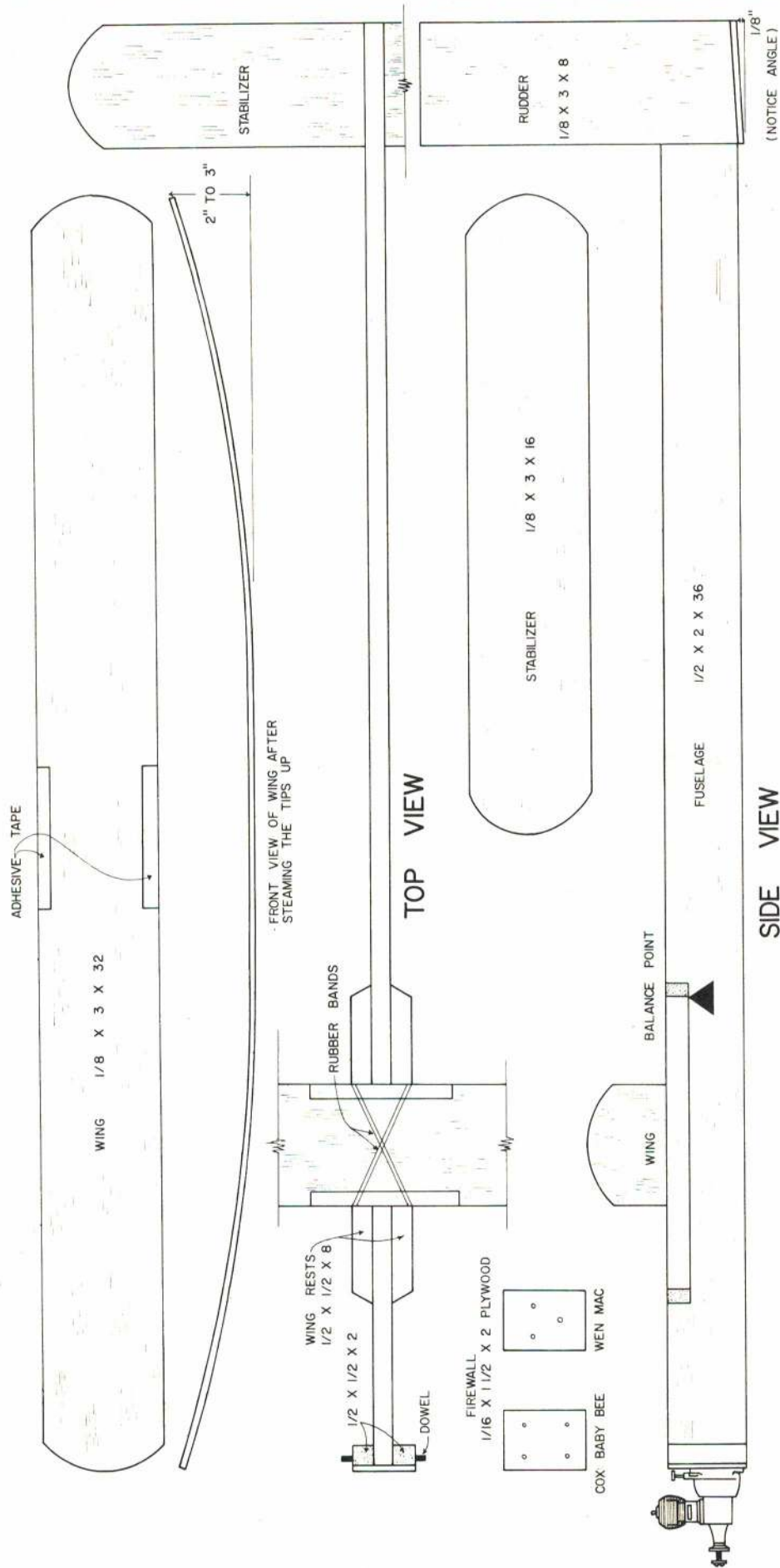
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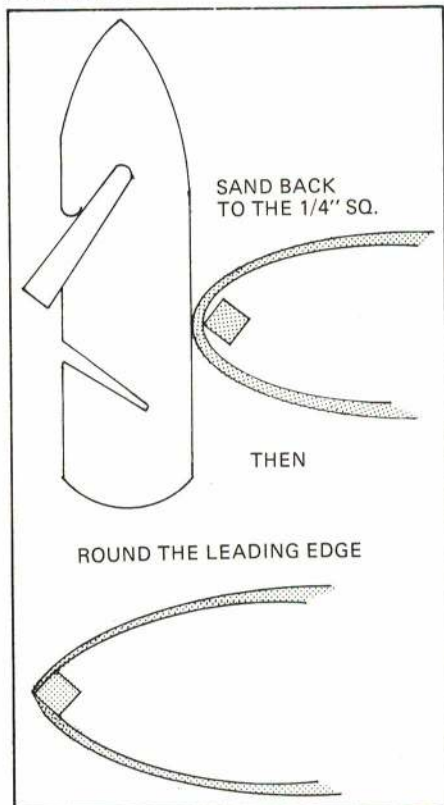
# AMERICAN HAVOK

MYSTERY MODEL



## AL RABE ON CL

Stunt Ship Wing Leading Edge Radius: A stunt ship wing which has a small radius or pointed wing leading edge may "hunt" in level flight and/or have poor stalling characteristics. The hunting is caused by the stagnation point moving alternately above and below the sharp wing leading edge with small changes in angle of attack. The poor stalling characteristics vary from light buffeting in the corners (particularly the lower right triangle), to a condition where the airplane is incapable of any corners at all, and may buffet in round maneuvers. Overly blunt wing leading edges don't seem to hurt flying characteristics—they just look bad.



There is really no way to predict just how sharp a leading edge you can get away with on any particular ship. I've seen a fairly heavy Mustang II with very sharp wing leading edges turn in many clean and tight patterns. On the other hand, I own a medium weight Mustang IV with moderate leading edges which buffeted even in round maneuvers. To make that Mustang competitive, the wing leading edges had to be blunted.

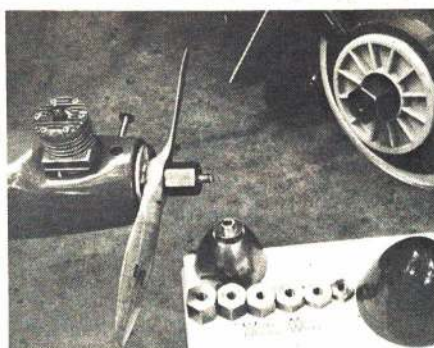
How much is enough? I don't know the minimum amount, but I never had any hunting or stalling problems on airplanes which had the wing leading edge sheeting sanded back, in construction, until the 1/4" sq. leading edge begins to show.

Nose Weights: In the past, nose weight was usually installed in the engine's rear crankcase cover. To adjust that type of nose weight the engine had to be removed from the airplane to gain access to the weight.

Bob Wilder has come up with a much better idea. He simply cuts steel hex stock into various lengths, drills and taps the pieces, and substitutes these weights for the regular prop nut inside the spinner.

There are several advantages to adding nose weight in this way. First, since the weight is located farther forward, less will be needed to shift the balance. Second, weight can be changed easily, in the field, to bring that new stunt ship into trim quickly. Third, the weight serves as a flywheel. (I'm not sure that the flywheel effect helps, but it doesn't hurt either.) Several thousand flights with these weights have convinced me that there are no disadvantages to putting the nose weight in the spinner.

Bob found that by the time you drill and tap 3/4" hex stock, it weighs almost exactly two oz. per in. If you haven't a lathe or a source of hex stock, Bob will make up a set of



six weights from 1/4 oz. to 1 1/2 oz. in 1/4 oz. steps for \$5.00 including postage. Bob's address is 2010 Boston, Irving, Tex. 75060.

Stooge: A stooge is a simple launching device to hold your airplane, engine running until you are at the center of the circle and ready for takeoff. The better stooges are operated by a separate trip wire which also runs to the center of the circle. Simply tug on the trip wire with your spare hand, then toss the trip wire aside when the airplane moves.

I've seen many different stooges. Most of them are very risky devices, poorly made, unreliable, and usually lack a firm, spring-loaded lock. The best stooge I've ever seen was built by my friend Dirk Tollenaar. I've used Dirk's stooges for five years to launch airplanes powered from 35 to 60 and have had only one accident. On that occasion, I simply forgot to hook up my Bearcat's permanently installed stooge hook to the stooge. When the engine started, the Bearcat ran between my legs, up to the wing leading edge and chewed up a wiping rag hanging from my hip pocket.

While not really in the business, Dirk will build you one of these stooges, including a permanent stooge hook for your tail-wheel strut, for \$4.50 including postage. Dirk's address is P.O. Box 1564, Irving, Tex. 75060.

(Continued on page 119)

## DON LOWE ON RC

"Never Too Old To Learn" Dept.: Have you ever had a pattern ship that can't be trimmed in spite of everything you try? I have. If you have a wing warp, forget it. If everything looks straight and the ship is balanced laterally, however, it should be trimmable—right?

Let me relate a recent experience that might just help. I had been struggling with my new Phoenix VI to get it to track both inside and outside to no avail in spite of every imaginable combination of balance and trim.

I know that "sealing" the ailerons—eliminating the gap between the ailerons and the wing—makes the ailerons much more effective; but I had never considered that a little gap would foul up the whole trim. And do you know what? It does! The problem is apparently with different amounts of gap on each aileron. Given this condition, you can trim it for one condition, e.g. inside loops, but then it's off on the outsides.

I simply swallowed my pride and sealed the gap with a little Citizenship's Slic-Tac and guess what? The airplane tracks perfectly inside and outside. It also appears more positive and predictable on other maneuvers. Apparently at an angle of attack flow through, the gap does weird things which result in out of trim conditions.

Dave Brown of World Engines had problems with his new Phoenix until he sealed the aileron gaps. His aircraft was squirrely in many flight modes, including straight and level!

OK, what's the moral of the story? Always fit your ailerons and other surfaces tightly to the fixed surface. Never leave a significant gap. You say you can't do this with pinned hinges? Yes, you can! Simply whittle out a small channel in the fixed and moveable surfaces to allow butting the two together. To permit surface movement, simply wedge-shape the leading edge of the surface for the required angular throw. (See sketch.)

To achieve a good positive seal, fit a thin sheet of mylar along the full length of the surface by slitting both surfaces along the

hinge line and insert. For a quick fix, stick tape or other suitable material over the gap; leave excess to permit surface movement.

Credit Due: In AAM's July issue I mentioned that Bob Aberle of Hauppauge, New York had developed an electronic timing device for warning fliers of expended flight time. Bob informs me that the device was designed by his good friend Vince Caluore of Kirkland, Washington. So let's give credit where credit is due.

This type of device which can be set at many preselected intervals gives a buzzer warning of lapsed time. It should be a particular boon to helicopter fliers who simply can't afford to run out of fuel!

Energy Shortage: These days everybody is concerned about the energy shortage. How about the loss of battery energy in your favorite bird as it screams by at Mach 1? It's usually disastrous. Treat your Nicads with care. Be sure they have been fully charged before flying and keep track of flights so you don't run them down. Put some sponge rubber around the pack to keep demon vibration from doing funny things.

Recently, I had a weird experience that exhibited the symptom of glitching. However, when I throttled back (which I fortunately could), the glitching went away. I traced it to a noisy battery that reacted strangely under high vibration conditions. So when you glitch, it isn't always the receiver.

If you're suspicious about the battery capacity, run a discharge test. First, fully charge the battery; then discharge it with a load at the rate of about 300 MA. Keep track of the discharge rate and when it starts to drop rapidly, terminate the test. A simple calculation (MA X HRS) will show if you're getting close to the specified rating. If the pack runs down prematurely it's usually one cell that's at fault; so check for the low voltage cell with the load applied.

Hydro-flying: While we're on the subject of flying techniques, let's discuss hydro-flying a little bit. In the April issue of the Long Island Radio Control Society newsletter, "Low Passes," George Myers enumerates some valuable pointers:

"The classical hydro takeoff: full up elevator, aileron rolled into the wind; punch full throttle (to limit spray period); ease stick toward neutral to climb 'on the step'; run to liftoff steering with rudder; ease stick some more to avoid departure stall; climb straight ahead to a safe altitude before making turn (your plane has to fly a little faster because it is carrying extra weight and drag).

"Water Landings: Set up your descent well out; flare to a nose-high attitude controlling sink with throttle; immediately after landing ease stick forward to taxi to stop; chop throttle completely and beach or dock on momentum.

"Sailing: Taxi on the step to minimize spray; use the down aileron for drag when turning (reversed control): turn from upwind to downwind taxiing on the step; turning from downwind to upwind is difficult. My Du-Bro "Sportsman" on homemade floats

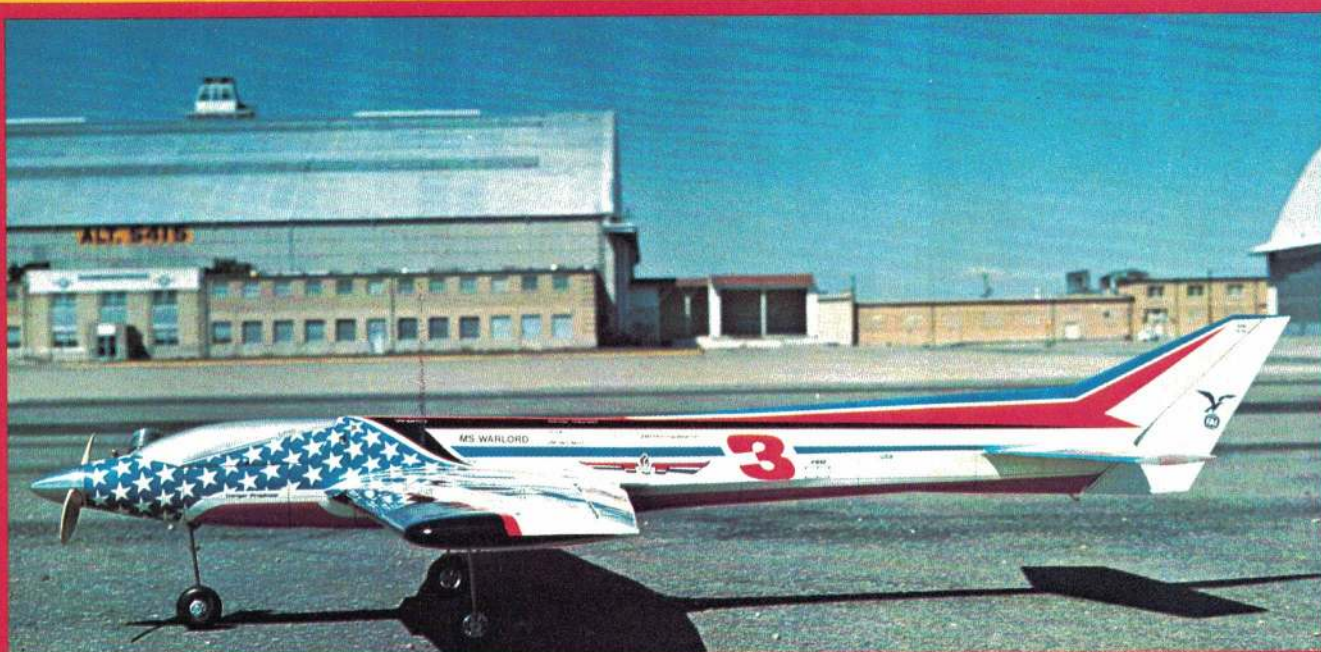
(Continued on page 121)

How about a biplane for Pattern flying? Sheldon Birenbaum has a Stand-Off Scale home-built with full stunt ability.



# Warlord

A graceful and thoughtfully designed contest pattern plane. Flies great in mile-high Denver—should be fantastic at sea level! / by Jim Wilmot



Above: Minimum frontal area and flowing lines help get the most out of the Warlord's engine/propeller. Sits high on the retract gear for easy rough and grass field operation. Right: The best way to enjoy good flying at high altitudes as in Denver is to have a lightweight plane. With all-balsa construction, this bird can weigh only 6½ lb. even with full-house, fuel, a big 60 and retracts.



# Warlord

The Warlord was designed to do only one thing: to win in FAI competition. Initial drawings were completed only after intensive study of the machines flown at the 1971 Internationals. From the information gleaned from this study, future trends were extrapolated and all of my past ten years of competition savvy was smoothly blended into one competent design.

Strict parameters for design were set up in order to achieve perfection. Consistency is first and foremost. Perfection of aeronautical design means nothing if the guidance, propulsion, or retraction systems are not on the same level of perfection. The old adage that the weakest link determines the strength of the chain seems apropos. To this end, Pro-Line, Supertigre, and Rom-Air were chosen respectively.

Consistency is the name of the game in that very often driving some 500 mi. to a contest, only three flights for the weekend will be allowed: two on Saturday and one on Sunday (and that's rough when you only get one flight in a day!). Therefore, there is absolutely no room for mistakes. Every flight has to be the best one of the meet. This principle must also be kept in mind during construction, for a slipup in assembly may (and probably will) blow a contest.

Modern RC competition history may be divided into four main categories; Smog-Hog, Taurus, Kwik-Fli, and post Kwik-Fli era. In this last era, almost any aircraft has the capability of winning any contest; there is no No. One design—they all fly pretty much alike.

Therein lies the rub. An old element has increased in importance—showmanship.

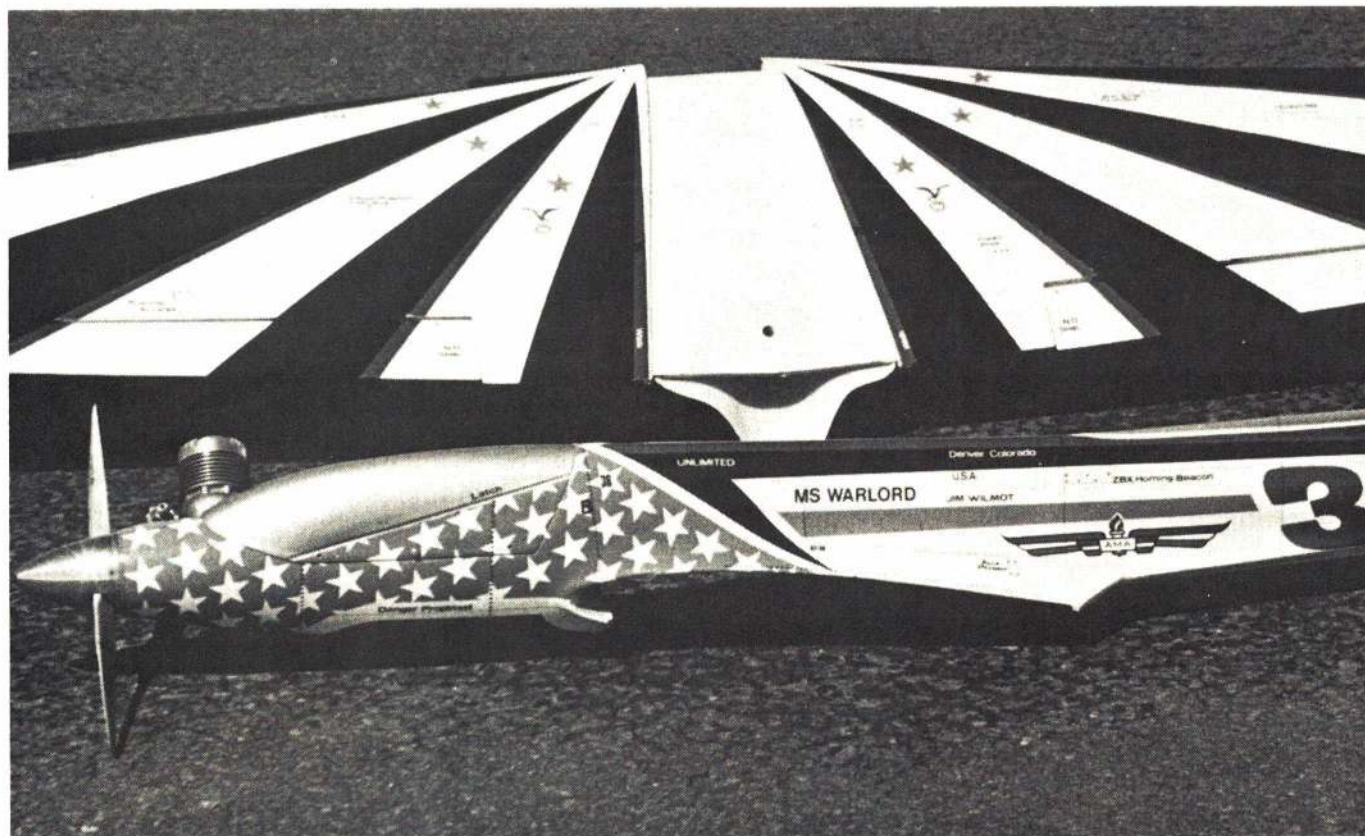
Performance is now simply a given factor; the variable exponent takes the form of presentation and pilot skill. The game has inadvertently developed into a form of one-design competition. To win at this kind of game, one must stand above the competition. The meet must be won before the flight begins through the use of an impressive-looking machine and a tremendous amount of practice.

Here are some of the principles set up in the design stages of the Warlord: The airframe must be such that power can be utilized as efficiently as possible. It should be smaller than the *Warlock* (my design featured in November 1972 AAM) and yet appear to be the same size as the current trend. Appearance should be given same priority as performance.

To achieve these goals, one main point was kept in mind at all times: cut drag wherever possible. I chose a 12½% somewhat laminar section, a heavily contoured fuselage and employed a flying stab. All information was fed into a CR-193 "computer" (modular exponents) and it was determined that, at periods of barometric pressure 29.98, 67° temperature, 34° dew point and



Top: Control surface areas are large; ailerons can be lowered for landing flaps. Note the highly recommended stall strip on the wing near the fuselage. Above: Heavily contoured fuselage is such that power can be utilized efficiently. Opposite, top: The wheel, when retracted, is partially out in the breeze; a big fuel tank fits easily. Bottom: There's a lot of room in front even with retracts.



# Warlord

45% humidity, optimum performance would be achieved. (These are the forecasted climatic conditions for the 1975 Internationals.) Also it was discovered that control reversal would be evident at 147 mph. (The sound-barrier effect, like the Reynolds effect, reacts differently on models.) Therefore a flying stab was a necessity. The fuselage contours plotted out by the CR-193 were not possible if a normal balsa framework was used. So a fiberglass mold was machined out of platinum-aluminum alloy noted for its resistance to warpage. (I wouldn't put you on now, would I?)

Here I should warn you about the treacherous pitfalls that may ensnare the builder as he attempts to mimic my melange.

## Construction

**Fuselage:** First of all, note that the construction has been altered from fiberglass to wood to simplify the chore. It has also been widened a smidgen to allow more room for equipment. (Some alleged authorities accuse me of designing too thin a fuselage.)

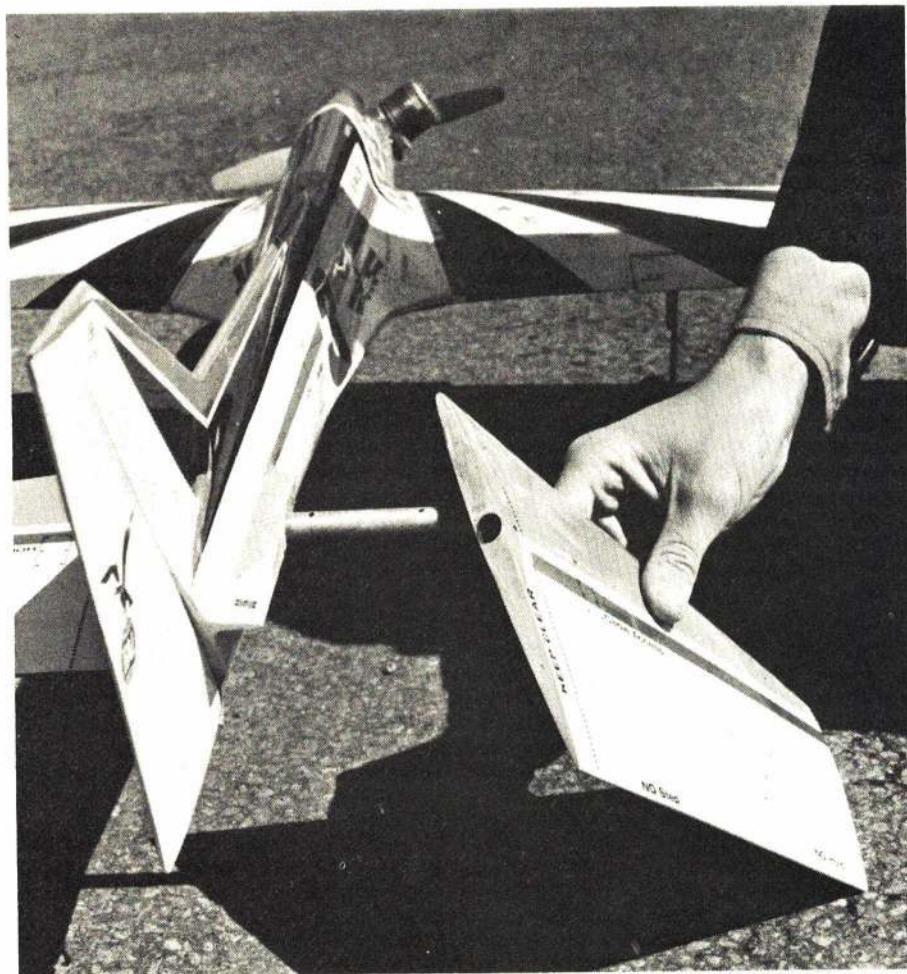
The basic structure should cause no real trouble if it is built on a jig. (The new A-Justo-Jig would probably work nicely.) Use a long, flat pine board with squaring blocks.

Note that the fuselage wraps around the front portion of the wing leading edge, which eliminates the need for front wing bolts or dowels. The bottom hatch for the wing is cut out *after* the fuselage is hacked out. Also, each wing servo (retract and aileron) is mounted on the bottom of the wing center section. Thus aileron trim can be adjusted without taking the entire wing off the fuselage, and the Rom-Air retract switch can be inspected easily. The rudder, elevator, and throttle servos are mounted on a 1/16" ply tray, which takes up very little room, can be fitted into tight spaces, and removed in about half a minute. For this kind of installation, use Kwik-Link connections on all servo output disks.

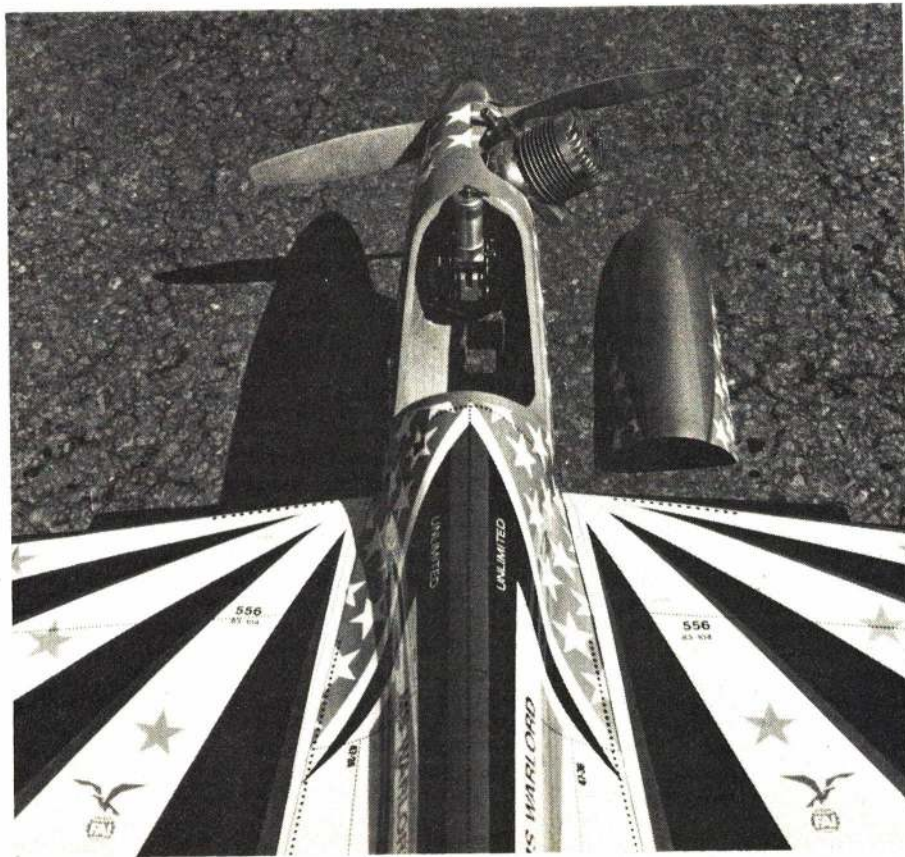
The canopy and cowl are made from fiberglass; the canopy may also be molded from clear plastic. The molds can be made in the wood-fiberglass tradition, or carved from styrofoam using the balloon-forming process.

The Wilmot lost-mold process is another method in which a plug is made from wood or finished styrofoam, and a thin coating of plaster is spread on the outside and left to dry. Then the plug is slipped out of the plaster, and a coating of matte fiberglass is placed in the plaster cavity and left to cure. Finally, the plaster is simply broken off with a blunt instrument (such as a size D sledgehammer) which leaves a quicky fiberglass cowl.

The firewall is a little tricky. Both the engine backplate and the Rom-Air nose gear must be bolted on their re-



Above: No wing keying dowel is needed here. Fuselage wraps around the wing leading edge and the fillets fit on the "step" at the center of the wing (see text). Below: All-moving stabs are becoming popular. The author first tried them successfully in his Warlock design (November 1972 AAM). Control is smoother with less drag; parts are removeable for easy transportation.

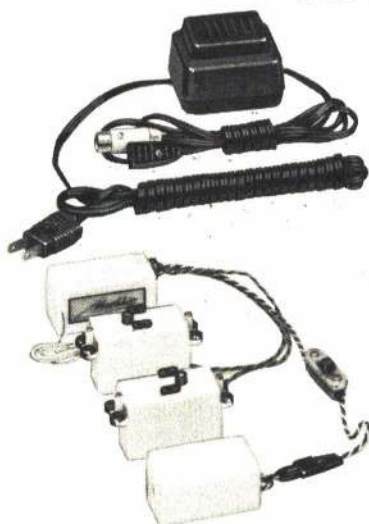


Plans on page 32

Text continued on page 85

# New Heathkit 3-Channel System

from **139<sup>95</sup>\***



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*Spitfire*

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SIXTY-THIRD IN A SERIES

# getting started in R/C

VISIBILITY AND MODEL CONTROL

JIM McNERNEY

In earlier articles we discussed the importance of strong, accurate model construction. We spent a great deal of time on radio selection, installation, care and operation. Suppose that you've built a strong, true, balanced plane with adequate power, a properly operating throttle and a radio that checks out fine. Now comes the hard part—you have to fly it.

As the airplane flies through the air, its position and attitude with respect to the ground is constantly changing. You, however, have a fixed position. All the treatises on learning to fly RC stress the ability to "put yourself in the cockpit." That is, you must visualize relationships from inside the airplane, rather than from where you are standing. In order to do this you must be able to recognize aircraft attitude and direction at all times.

Airplane shape is the first big help. By shape alone it is difficult to tell whether a flying wing is right side up or upside down. On the other hand, a high wing monoplane with lots of dihedral gives you many clues on attitude and direction of flight.

Another important item is the plane's color. Some colors stand out; others tend to blend into the background. On a bright, sunny day you can see almost any color at medium range. As the model gets farther away, however, color becomes more difficult to distinguish. You might take a tip from the people who paint emergency vehicles. They have found that a bright lemon yellow affords the best visibility under a wide variety of light conditions. Red can be very difficult to see under certain conditions as can blue, green, brown, grey and other medium to dark colors.

Basic color choice is crucial, but contrasting colors in the paint scheme are

equally important. If you pick a predominant color for the model, a large contrasting design should be put on one upper or lower wing panel. You can use one or more wide stripes, a rectangle, diamond or some other easily distinguished shape. Some examples of contrast are black on white, yellow on blue, or white on red. Remember, a skinny stripe won't even show at 300 ft.

No matter how bright the bird, if your vision isn't up to par, you can still lose the airplane. On bright, sunny days wear sunglasses. If you have trouble seeing at a distance, have your eyes checked. If you require glasses, be sure to wear them. And keep your glasses clean! It can get pretty hairy trying to sort out the plane from the fly specs and fuel spatters. It's not wise to use plastic-lensed sunglasses—they may not be fuelproof.

It's a good idea to wipe off your plane after each flight and to use a spray cleaner once in a while. It not only improves the appearance and visibility, but it helps keep the weight down, too. ("But I thought that oil made it slip through the air better.")

A bright color on the leading edge of the wing helps as you make your landing approach. If the background is cluttered with trees or other obstructions, the model tends to blend in. Since the relative motion is small (the model is coming essentially straight toward you), it is hard to keep it in sight. This is one argument for having a relatively short final approach. You should allow yourself plenty of time to get set up for the landing, but don't drag the model in from half a mile out. The same applies to takeoffs. Don't pull up into a big hairy maneuver, but establish a good rate of climb to get out of visual background clutter as quickly and safely as possible.

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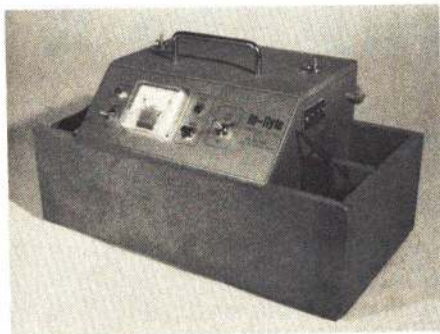


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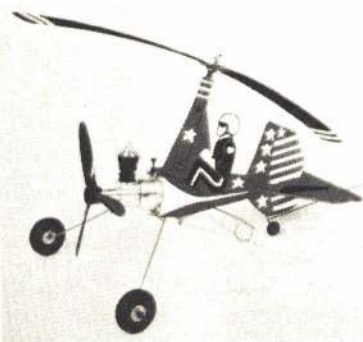
**Fibo Craft/Super Sedan Cruiser.** This 26 in. craft is geared for 09 to 15 engines or six volt electric motors. Boat's fiberglass hull makes it quick to build. Kit includes all detail fittings, ply and pine deck parts, stand, plans and instructions. Six different hull colors available. \$38.00. Fibo Craft Models, P.O. Box 489, Bay Shore, N.Y. 11706



**Hobbies International/Starter.** Heavy duty, multi-purpose starter uses planetary gears and operates off a 12 volt system. Starter can be used with all planes, boats, cars, and helicopters with the use of adapters and accessories provided. Unit can be plugged into car socket or clipped to battery terminals. Price is under \$30.00. Hobbies International, P.O. Box 1121, Tustin, Calif. 92680



**Jack's Custom Models/Advancer.** A high performance sport and competition plane, this new kit is perfect for a flier's graduation from a training plane. Construction is extremely simple, the plane flies easily and can perform in A or B patterns. Wingspan is 52 in. with 572 sq. in. area. Plane uses 35 to 45 engines and four-channel radios. \$35.00. Jack's Custom Models, Inc., P.O. Box 266, Avenel, N.J. 07001



**Kopter Kit/Copter.** This control line autogyro is sure to provide a unique experience for all UC fliers. The ship has a 17 in. plastic rotor and an all-balsa fuselage. Fifty-ft. lines are used with an 049 engine. Not only will it perform loops and dives but can be adjusted for fast or slow flight—it will actually hover in a strong wind. Kit includes die-cut parts, wheels, rotors all-metal and hardwood. \$6.95. Kopter Kit Co., Box 607, Saddlebrook, N.J. 07662



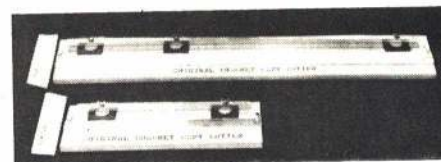
**Scientific/Man O' War.** French gunboat kit for display purposes features carved hull, cast metal fittings and cloth sails. Once considered England's greatest threat due to her maneuverability and firepower, the ship has 96 guns. An authentic scale kit. \$21.95. Scientific Models, Inc., 340 Snyder Ave., Berkeley Heights, N.J. 07922



**Dave Platt Models/Masterpiece Series.** First in a series of dramatic wall paintings depicting famous aircraft is the *Spitfire Mark 9*. The painting measures 30 x 18 in. and uses authentic, matched colors. \$3.95. The *Spitfire* will also be Dave Platt's first stand-off scale ship to be released in late summer. Dave Platt Models, Inc., 1300 W. McNab Rd., Ft. Lauderdale, Fla. 33309



**Sun-X/Sneaky.** An all-foam airplane with aluminum spars and stiffeners, this kit is so prefabricated it can be finished in a few hours. Modeled after the U-2 sailplane, it uses 09 to 15 engines for added performance. 7 ft. wingspan, for three-channel radio. \$32.95. Sun-X Plastics, Inc., 4125 Richmond Ave., Houston, Tex. 77027



**Crocket Replicas/Strip Cutter.** Save money by cutting your own strips, spars, tapers and angles with this strip cutter designed especially for model builders. Tool is versatile and comes in two sizes—small (18 in. length) and large (38 in.). Easy-to-use cutters sell for \$9.95 and \$12.95. Crocket Replicas, 1442 N. Fruit St., Fresno, Calif. 93728



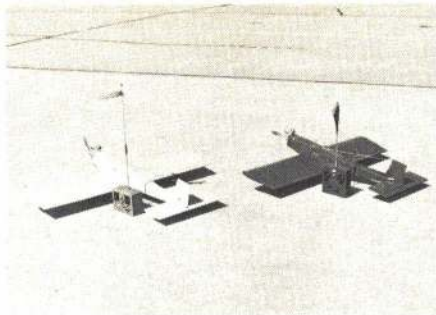
**T & L Glasslite/Super Glue.** A high strength, water-base contact cement designed especially for gluing cardboard, balsa or plywood skins to a foam wing or stab. Eight oz. bottle, enough for one large or two small planes, \$1.75. T & L Glasslite Wings, 20408 71st St. E., Sumner, Wash. 98390



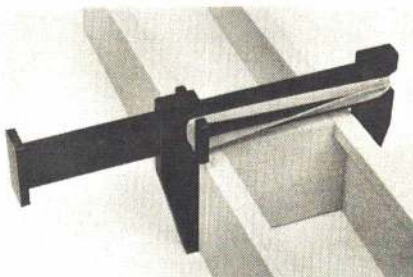
**Midwest Products/Microglas.** An ultra light-weight fiberglass cloth weighing only 6/10 oz. per sq. yd., this cloth is ideal for skinning, reinforcing, cowls, even fuselages. Cloth comes in 36 x 38 in. pieces for \$2.95. Midwest Products Co., 400 S. Indiana St., Hobart, Ind. 46342



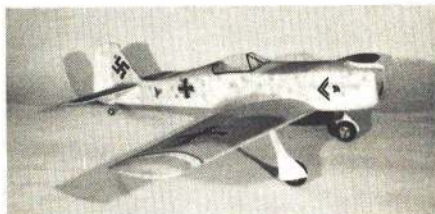
**Masco 1/2A Skymaster.** First in a series of seven 1/2A semi-scale Cessna model planes is this Skymaster, a unique ship that can be built in either single or twin engine configurations. The kit is all-balsa and parts are pre-cut and then sanded. All necessary hardware is included along with simple photo instructions. \$5.95. Masco, P.O. Box 26412, Houston, Tex. 77032



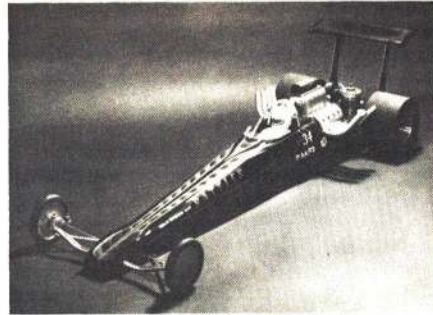
**Tidewater Hobby/Square Shooter.** This easy-to-build kit is ideal for the Sunday flier. Dave Robelen's design is docile yet aerobatic. Balsa kit includes necessary fittings, linkages and pushrod material and takes only six to eight hr. to construct. Plane has a 48 in. wingspan and takes 29 to 40 engines. \$29.95. Tidewater Hobby Enterprises, 103 Bannister Dr., Hampton, Va. 23366



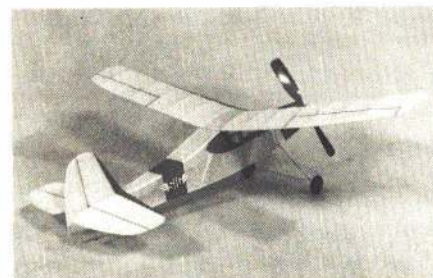
**Kraft/Clamps.** Here's an easily adjustable clamp for modeling made of molded glass reinforced nylon. Tension is provided by rubber bands looped over the top of the clamp. Glue can be easily scraped off of the clamps, keeping them clean and ready for use. Two sizes available: small—\$1.29 a pair; large—98 cents each. Kraft Systems, Inc., 450 W. California Ave., Vista, Calif. 92083



**Long Island/FW-190.** Joining the *Bearcat* and *Thunderbolt* in a new series of Stand-Off Scale WW II models is this *Focke-Wulf 190*. The all-balsa kit is Nick Zirolli's design. It goes together quickly because of pre-shaped and die-cut parts. Plane takes 40 to 60 engines and has 53 in. span. Kit includes all hardware. \$50.00. Long Island Hobbycrafts, Inc., 7800 Shore Front Pkwy., Rockaway Beach, N.Y. 11693



**Model Racing Products/Dragster.** For those who want a competitive dragster without having to scratch build, this 19-powered car is just the thing. The *Rattler* is available with chassis, all hardware, exhaust stacks, brake; drive set, Lexan body and more. In 1/8" scale the car does a scale 1/4 mi. in four sec. E.T. Complete kit sells for \$79.95. "Basic" kit with chassis, body and some hardware sells for \$29.95. Model Racing Products, Inc., 7925 S. Second Ave., Seattle, Wash. 98108



**Sig/Tiger.** A new version of an ageless Old-Timer which has box fuselage with cabin, one of the simplest and most appealing designs. The built-up kit weighs one oz. for good flight performance. Included in the kit: all necessary balsa, covering material, rubber, prop, wheels and building and flying instructions. Wingspan is 21 in. \$1.95. Sig Mfg. Co., Inc., 401 S. Front St., Montezuma, Iowa 50171



**Stafford/Rickey Rat.** Hot new pylon racer has foam wing cores, balsa fuse, and molded cheek cowls and wheel pants. This Formula I machine is sure to be the one to beat. Kit includes formed canopy and main gear, plans instructions, and scale three-views. Jack Stafford Models, 12111 Beatrice St., Culver City, Calif. 90230

KRAFT 3-CHANNEL SPORT SERIES  
JIM Mc NERNEY

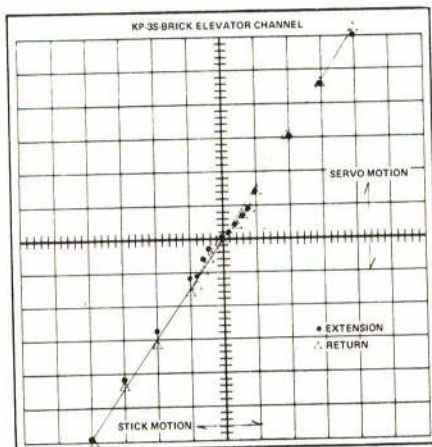
**Set:** Kraft has added a third channel to the Sport Series two-channel brick (KP-2B). As with two-channel unit, set is available with either two single axis sticks or a single dual axis stick arrangement. Third channel is operated by conventional thumb lever. To obtain this third channel, Kraft has come up with an entirely new decoder/servo amplifier board.

Our set utilized conventional Series 73 three-channel transmitter and the circuitry is presumably used directly in the Sports Series Three-Channel. The transmitter, however, will use dry batteries, not NiCads. Optional rechargeable flight pack and transformer isolated fast charger were furnished. As in the two-channel Sports Series, all circuitry is made up of discrete components, no ICs. Dual frequencies are available.

**Transmitter:** It is anticipated that the third channel will be used for throttle in the typical rudder, elevator, motor setup or, as in Kraft's new Wingmaster plane kit, for elevons (combination of elevator and aileron) and throttle. A nine-volt dry battery is utilized for transmitter power and should last for essentially a whole season.

**Receiver/Servo Brick:** The receiver section of the brick is the same one used in the current two-channel Sports Series radio. It has a double tuned front end, three stages of IF and can have dual frequencies. Decoder and two servo amplifiers are mounted on separate board. This is entirely new and redesigned. It contains the decoder and two servo amplifiers for the integrally mounted servomechanics. A conventional pigtail is provided for the third channel servo. All circuits are made up of discrete components. The servomechanics are re-packaged KPS-12s. The total brick weighs five oz. and measures 3.55 x 1.67 x 1.42". Servo torque output measured 11 in.-oz.

**Overall impressions:** The addition of a third channel will greatly enhance the set's appeal. It will now be possible to control three functions, which seem to be minimum for powered aircraft, while maintaining the obvious advantages of the brick configuration. The fact that the unit will be offered for the same price cannot help but increase its sales appeal. It should be noted from the performance curve below that this radio is on a par with almost all sets reviewed and does not suffer in performance as compared with integrated circuit units.

ASTRO-10 AIRCRAFT  
ELECTRIC MOTOR  
DON JEHLIK

The Astro-10 was put on my test rig with a series of props in order to get a feel for its potential as an RC powerplant. The motor weighs 285 gm., battery pack furnished weighs an additional 360 gm. for a total airborne weight of 645 gm. Add to that a lightweight RC system and you'll know the load a proposed plane will have to carry.

Starting with props and initial rpm for each, the chart below shows HP and projected airspeed at the start of the flight. The airspeed figure represents 80% prop efficiency.

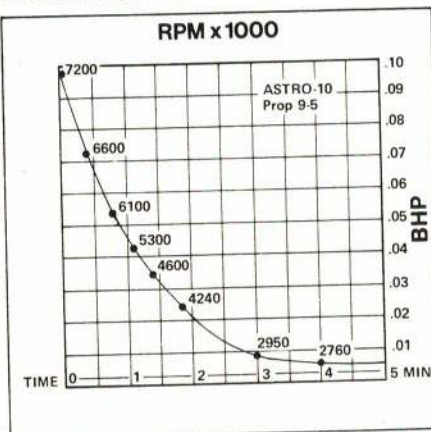
Taking the 9-5 prop through a discharge cycle on the battery pack produced the results shown on the graph. Note that from maximum HP of nearly 0.1, the motor produces slightly less than half that amount at the end of the first minute of the run. At the end of a four-min. run, the HP is 1/10 original.

I was puzzled by all this and asked Herb Stockton to give me a hand with the tests. His first comments were that performance probably related to the amount of current the motor was capable of using and the discharge characteristics of the batteries used. He then measured the current used during a discharge cycle and it agreed with the test stand results.

I noticed the battery pack got quite hot during five-min. runs. I tested the surface of the batteries at 162°F. Provision for directing cooling air through the battery pack should be included in plane design.

I ran a test with C size alkaline batteries to compare battery sources. Ten batteries measured 14.2V and weighed 600 gm. Maximum rpm on the 9-5 prop was 3900 at start. Rpm reduced to 3000 at 12.5 min. The discharge characteristics of the alkaline cells is better in terms of the length of time of run and relatively low rpm loss (3000 v/c 3900 at start). But HP with this setup was .02 at 3900 rpm.

The Astro-10 Electric Motor can power RC aircraft. The discharge characteristics of the batteries and subsequent motor run will not provide the constant type of power fliers are used to. Specifically designed aircraft and limited in-flight maneuvers can be expected.

MIDWEST SUPER CHIPMUNK  
DUANE LUNDAHL

Midwest's latest ARF kit is a scale model of Art Scholl's Super Chipmunk aerobatic plane. The plane, sized for 09-19 engines, is made of molded styrofoam with all necessary fuselage stiffeners, firewall and mount blocks in place. The only "building" is the installation of engine, radio, landing gear and controls. You don't even have to paint it (but it's prettier if you do). The hardware supplied is almost as complete—you'll only need to buy a tank, wheels, and Nyrods.

The model is exceptionally strong without excess weight. The fuselage in particular evidences care in design. I'm sure the molds were not inexpensive. Plans furnished are equally well done. All questions are answered by them.

The plane went together without a hitch and when you finish putting in a tank and an OS.19, Kraft dual conversion radio with the new (large) battery pack and four KPS-12 servos, the full little airplane weighs just under three lb. I suggest that you use the recommended accessories, because they've been engineered in and just fit. Very little gluing is involved; five min. epoxies are the best to use. Our model was finished with Testors PLA spray enamel for plastic models. (Remember dopes won't work when you're working with styrofoam.)

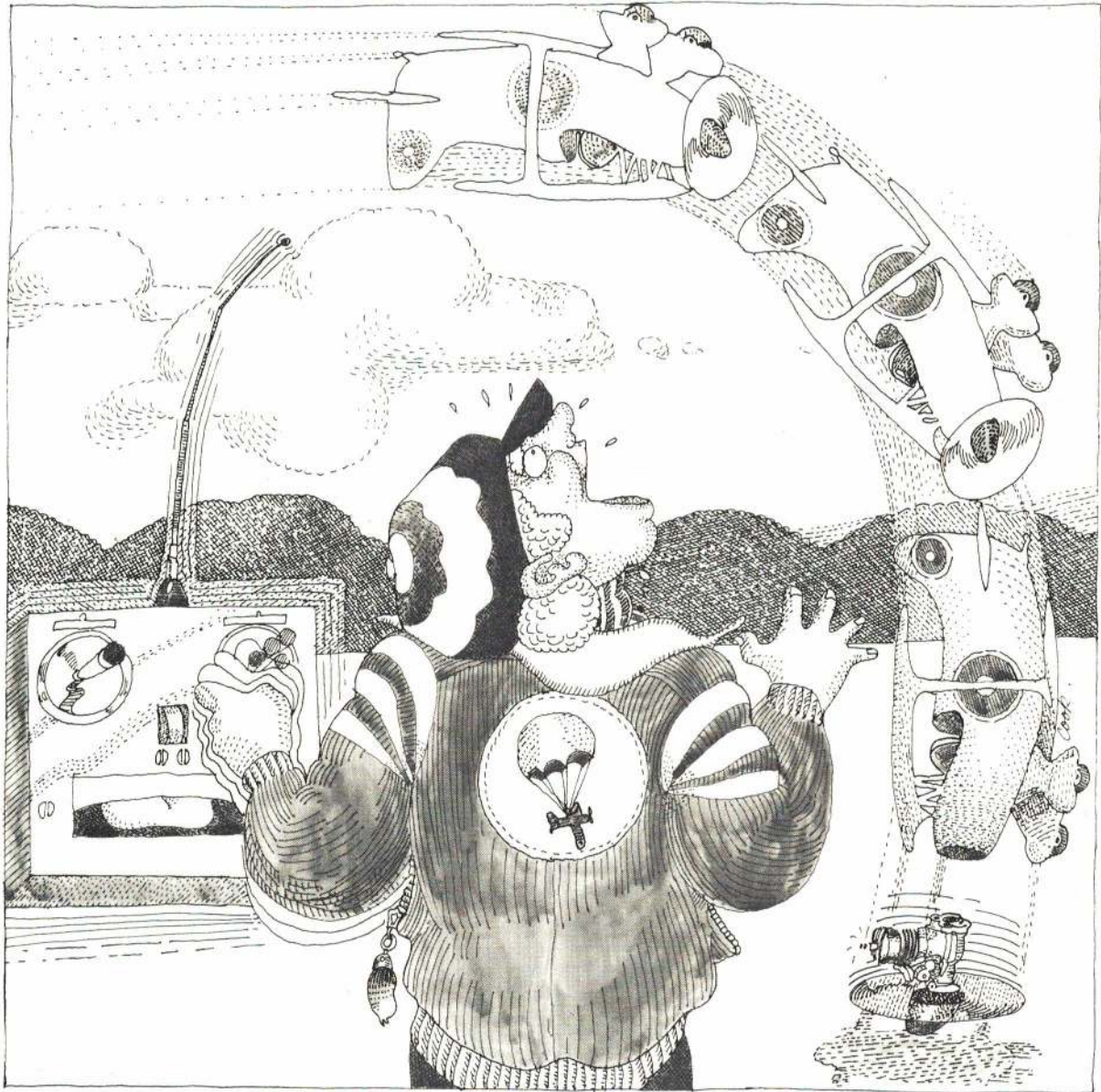
When the day for test flying came around, I was frankly doubtful of what the results might be. This is a compact model and seemed awfully heavy when we "hefted it." There are 325 sq. in. of area and, at its weight, the wing loading is not excessive. This was amply proven by a less than 20 ft. takeoff run and beautiful flying characteristics. This fast, stable, smooth airplane is a pure delight to fly. There are few airplanes this size which will fly as well. It is capable of all maneuvers, except for some vertical ones which require the higher power to weight ratios of a 60 power ship.

You can't get too much aileron throw since this model is quite insensitive in the roll axis. We are now flying using the inner hole on the control horn and things are just right. Don't be surprised if your Chipmunk tends to increase its bank angle during a tight turn and you have to compensate with slight opposite aileron. This is the only "bad habit" mine had, after a couple of flights, I automatically compensate and don't notice it.

This model shouldn't be flown with less than two channels of control and those should be elevator and aileron. If you have three channels, fly elevator, aileron and throttle.

Add rudder control last, as it is only effective for taxiing on the ground. Don't use a free swiveling tail-wheel if you intend to taxi the plane. If you fly from grass as we do, keep the landing gear bent far forward to prevent nose overs on the landing roll out. The Chipmunk, though fast at full throttle, it slows beautifully for landing and will do whatever maneuver you command including beautiful spins.

# How not to get stuck with an insensitive stick.



Control is the essence of R/C flying. Precise control. Control you can adjust to your own style of flying. But on most transmitters, the tension in the control sticks is pre-set. And pre-set tension can leave you hanging. It may be too stiff or too soft. And in a critical situation, a battle with an insensitive stick can have crashing results.

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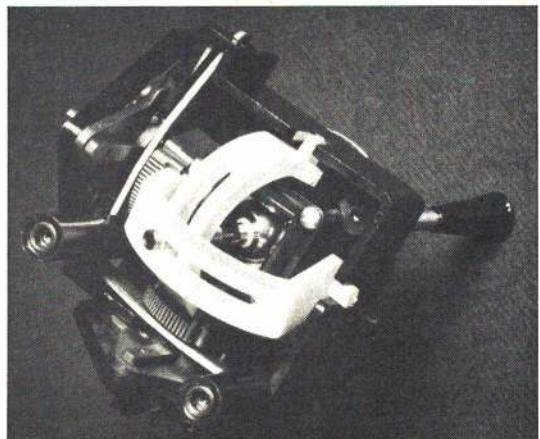
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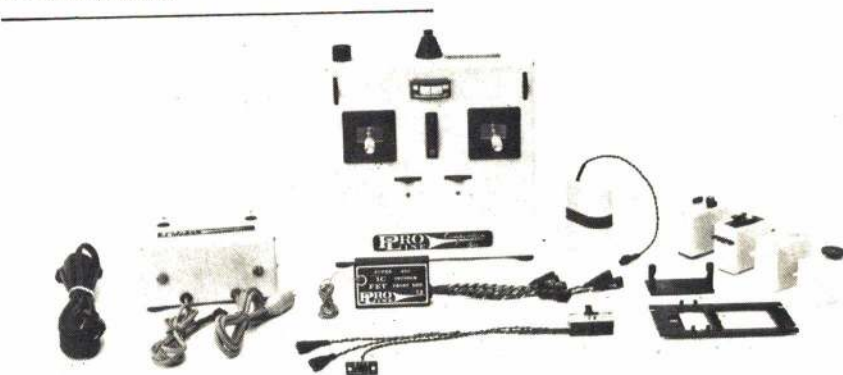
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## PRO-LINE COMPETITION SIX FRED M. MARKS



**Set:** Competition six-channel with open-gimbal sticks and PS-15 servomechanisms.

**Features:** Competition six includes precision-made open-gimbal sticks, receiver that achieves outstanding selectivity for single conversion receiver.

**Transmitter:** Both transmitter and receiver feature plug-in RF modules that permit operation on any frequency, in any of the three bands of your choice (you must have a technician's license to operate on 50-54 MHz). While this approach is more expensive (one must purchase modules rather than change-crystals), it permits movement from band to band. The transmitter is quite powerful with a radiated output of about 600 milliwatts. All discrete component circuitry is used in encoder; a free-running multi followed by six half-shots, as always. Buddy box arrangement is standard as is external, transformer-isolated charger that permits independent charging of transmitter and airborne packs. High-rate, automatic charger is optional.

**Receiver:** Uses American-made IF cans in a four-stage IF circuit, receiver front end that uses FET transistor between RF tuning stages for excellent image rejection and low noise. Eight-bit shift register decoder and external, individual Deans connectors are used. Receiver case is metal for further rejection of spurious radiation.

**Servo:** Servomechanism and IC amplifier are used; external output drive transistors are used. Current drain is sufficiently high that the derated 800 mah battery pack is standard. Servos are precise, powerful and fast.

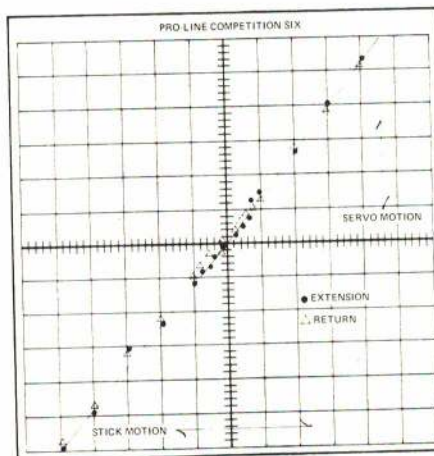
**Performance Evaluation:** Temperature tests 0°F to 150°F were satisfactory. Flight-test in Pilot Skywagon satisfactory on 72 (purple-white). An outstanding system.

**Criticism:** More current drain than necessary, but very good resolution. Would prefer

less stiffness in wire bundle from receiver.

### Specifications:

**Dimensions\*** Transmitter—6½H x 6-5/8L x 2T; Receiver—1-3/8W x 2¼L x ¾T; Servo\*\*—2.25L x 1.75H x 11/16W; Battery pack—2 x 2½ x 1. Total airborne wt. with 4 PS 15 servos—approx. 13 oz. Transmitter output\*\*\*—600 milliwatts; Receiver sensitivity\*\*\*—1 microvolt or less for full control of decoder; Receiver selectivity—3 db down at ±2 kHz, 6 db down at ±3.1 kHz and 2 db down at ±5.4 kHz from selected frequency. Servo output thrust—3.38 lb. at .38 in. Torque—1.27 in.-lb. Servo transit time—0.6 sec. end-to-end. \* Dimensions—in. \*\* Length includes mounting lugs; height includes output wheel. \*\*\* Mfrs. data.



The mechanical parts are made of aluminum, brass, and steel.

The multitude of blocks and pieces which make up the Hughes fuselage can be assembled into a finished two-tone painted assembly in four nights. I used a polyester resin base and an epoxy paint finish on mine. The canopy took me one night to assemble and two nights for taping and painting the trim. The rotors only took light sanding and a polyester resin and epoxy paint finish. The rest of the assembly was just that! A screw, nut, and bolt affair. I used Sears filled epoxy where Locktite was called for—either is OK, although Locktite is easier to take apart later.

I made one modification to the Hughes. I rerouted the tail rotor collective pitch pull cable under the metal engine mount plate by inverting the servo in the servo tray. As shown on the plans, it zigzagged back to the tail rotor over the engine mounting plate and I thought it would be in the way for normal maintenance later on.

The tail rotor is sized for minimum trim change between hover and fast forward flight. This can cause sudden whip around to the right while hovering if one is not prepared. With rotary servos, a mechanical advantage is gained by setting the transmitter tail rotor trim to 1/2 right and adjusting the tail rotor hover trim with the Kwik-Link adjustment at the tail rotor. This affords generous left throw and very little right—a desirable combination.

To translate between hover and forward flight, set trim lever full right for forward flight. Other than adjusting some extra forward

## REX MODEL PRODUCTS MESSERSCHMITT Bf-109E DEWEY NEWBOLD



Rex Model Products' new Messerschmitt Bf-109E is an all-balsa, 60-powered, Sport Scale kit of exceptional quality with many features not found in similar kits. The entire kit is cut from highest quality Sig AAA balsa and not the lower-grade bulk balsa used by most kit manufacturers. Full-length fuselage sides are of matched balsa sheets.

Included in the kit: Plywood doublers and spruce wing spars make the airplane quite sturdy when finished. Hardware such as clevises, horns, tail-wheel apparatus, and heavy-duty 3/16" wire landing gear struts (instead of the usual 5/32"), and even modeler's pins. All parts are precise and are machine cut rather than die cut.

The kit is well-packaged with parts grouped together in the box for quick identification. Each part is stamped with a number which keys it to the plans and to a separate parts list. An instruction booklet with attractive cover is also included. Instructions are simple and complete with useful hints on flying the airplane, sources for scale data, and a list of accessories available for the kit, such as special 75° retract gears available from B.K. Products. A Profile Publications booklet is included for scale data and coloring information.

Each kit is given a serial number, and the purchaser's name and address are kept on file. Owners are kept abreast of any new developments concerning the kit and receive advanced information on new releases from the company. A self-addressed postcard is included which the builder may use to correspond with the manufacturer in the event of problems or questions concerning the kit. Truly personalized service!

Parts fit extremely well and even the intricate canopy framework is easily assembled from pre-cut parts. Lengths of 1/4" sq. balsa are used in a very clever manner to provide jigs for the wing and fuselage construction. Construction is quick and simple involving only slightly more work than most low-wing pattern ships. The engine is firewall-mounted and can be installed upright, side mounted, or inverted. Wings are full-sheeted and very sturdy.

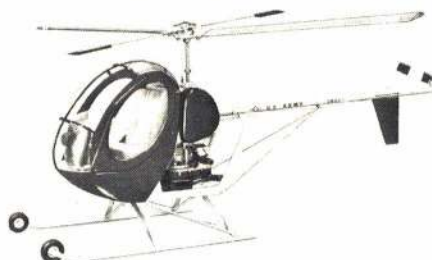
Flying is not critical as long as the CG is kept well forward as shown on the plans. Ground handling requires some caution because of the unique landing gear configuration inherited from the real plane. The test model weighed 6¾ lb. ready to fly and the 660 sq. in. wing area provides more than ample lift.

It is difficult to find fault with this excellent new product; it should make a very enjoyable project for the RC enthusiast. The kit is available from Rex Model Products (formerly Handcrafted Models), 3323 Fredricksburg Rd., San Antonio, Tex. 78201.

ward trim on transmitter to maintain forward flight speed, no side main rotor trim corrections are apparent at any speed. The Hughes 300 makes good right and left main rotor turns at any speed over approximately 25 mph without any tail rotor control necessary; at low cruise speeds, however, I prefer to use tail rotor control with main rotor control to get good coordinated turns.

Although construction looks insurmountable, once started, parts fall rapidly into place. All construction and assemblies are more than structurally adequate. Flight stability is more than acceptable to the seasoned chopper flier, and adequate for a beginner.

## DU-BRO HUGHES 300 DAVE KEATS



The Du-Bro Hughes 300 has a main rotor span of 57½ in. with 2-1/8 in. width and a thick Clark Y section. The tail rotor's overall span is 12½ in. and is 1-3/16 in. wide with a normal Clark Y section. The servo paddles are 2 x 4" each with a thin Clark Y section. The fuselage is 49 in. long, less main rotor and tail rotor disc projections, and 8 in. wide. The Hughes's average flying weight is between 14 and 15 lb. It is powered by an O&R Compact Engine with integral pull start, clutch, gear train, and main rotor shaft as one complete assembly.

The materials used in the fuselage construction are balsa, hardwoods, plywood, and vacuum-formed plastic parts; the main and tail rotors are made of pre-shaped hardwoods.

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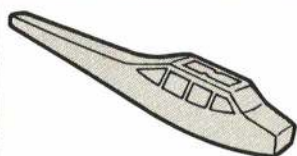
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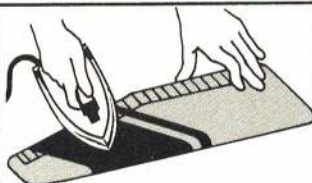
As a special introductory offer, this coupon is worth \$1.00 off the \$7.98 list price of Kwik-Cote at all cooperating hobby shops. This coupon is good until December 1, 1973. Only one coupon good per sheet of material purchased. This coupon has no redeemable value by the retailer.



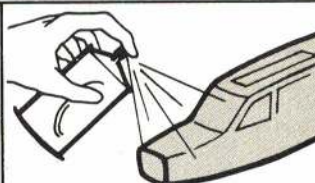
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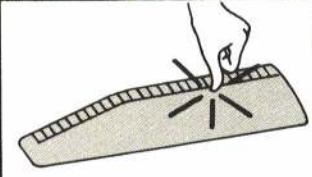
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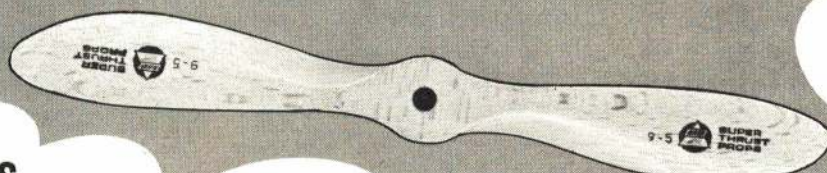
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## JOHN SMITH ON CL

**Fiberglass Finishing:** For those modelers who are using fiberglass resin as a finish on Speed models, here are some tips that might make your day happier. Use the resin full strength for the first few coats, then sand with 220 dry paper when hard. Do not sand to the bare wood. If you do, recoat these areas only. Then sand to blend in the "patched" areas with the rest of the surface.

For the finish coat, try to thin the resin mix. I have been using regular lacquer thinner for years with good results. I use about 10% thinner with my resin. I have used this method with four or five different resins from different manufacturers. It has always worked.

Stir the thinner into the resin before adding the hardener (MEK). I double the normal amount of hardener and stir well. This mix can be sprayed with the self-contained spray units that have the pressure can on the paint bottle. Pre-Val is one manufacturer. Check your local paint shop that supplies the auto body shop trade. These bottles are used for auto touch-ups and work very well.

When the spray coat is dry, use wet or dry paper, 220-320, with warm water and dish-washing detergent as the lubricant for the paper to knock off the surface film. The surface should be ready for you to either rub out to a gloss or spray on your favorite epoxy color finish. Try the thinned resin on a scrap piece of wood first to be sure the resin you use will set up with the thinner. For those of you who haven't used resin before, take care with the hardeners. They are dangerous like anything else if used in a careless manner.

**Sanctions on Top of Sanctions:** The problem of meet dates overlapping has sprung up again this year. In District III a large two-day meet was cancelled due to overlapping in the area. With the limited number of Speed meets being held, it's a shame that a number of them fall on the same dates. Local fliers want to be loyal to hometown sponsors so they fly in their hometown meets, keeping attendance down at the other contests.

If meets are being scheduled in your area, have your contest coordinator contact other coordinators in adjoining districts to make sure your date doesn't conflict with other meets already scheduled for that date. You will have better attendance at each contest and more contests to attend.

**1/2A Scale Racing:** This event is gaining popularity all over the country. Many newsletter correspondents still write to me about the success they are having flying the midjets.

A good source of engine mounts is Midwest Model Products, Hobart, Indiana. Their molded plastic engine mount/landing gear assembly is just the ticket for the 3/4" scale sizes. It will fit on a 1/4" sheet profile fuselage with two bolts. The extra material of the mount left on each side of the engine, Cox Baby or Golden Bee, can be cut off, resulting in a very clean, strong, front end.

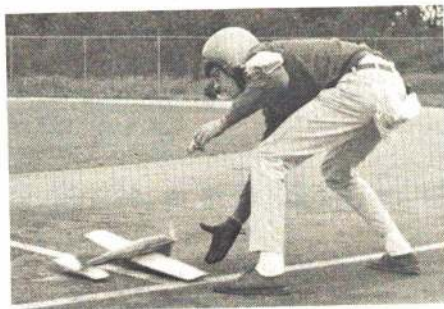
Many of the guys are using Kirn L.H. props and turning fairly good speeds. The pit stops are where it's all at, though. To be sure of fast restarts, keep the spring starter on the engine. Where modifications are allowed, run the TD cylinder/piston assembly and TD plug. Using the plug alone will give a good increase in rpms.

Many hobby shops carry "glider stock," a semi-airfoiled sheet in 1/4" thickness that makes a great wing. It's quick, too.

Go the limit. In most places they allow a stab 25% max of wing area on the tail feathers. Use a hole close to the pivot on the bellcrank and the outside hole on the elevator horn. With lines spaced about 1 1/2" apart on the handle, these models can be flown very easily. Using the Golden Bee tank, runs are usually 45 to 55 laps, depending on settings.

Sometimes it's better to go with a more economical fuel rather than have the extra pit stop in the 100 lap races. This is probably the lowest cost racing event in which you can participate. If you haven't tried it, get your feet wet. It sure puts the fun back into flying.

**Coming Contest:** Dayton, Ohio, Sept. 8-9. Ohio's Mini Nats Speed contest. All the good ole guys come to this one. Usually a couple of records, much socializing on Saturday night. All classes, nice trophies, an annual meet that is better each year.



Henry Nelson of the Mearns-Nelson pit team in FAI T.R. at Cleveland, Ohio meet.

**How to advertise a Speed meet.** Unknown young woman shows off trophy and C Speed model.



**Flash! First 220+mph Speed Flight:** Glen Lee turned a 209 mph flight in B Speed on June 10. Glen, running a homebuilt Lee Wisniewski 29, was timed for only six laps, but when computed for seven laps, it actually figured out to 214 mph. The flight was scrubbed due to the timing error, but contestants in the pit got it for the 209 for the full seven laps. As far as I know this is the first flight over 200 mph in competition. Congratulations, Glen.

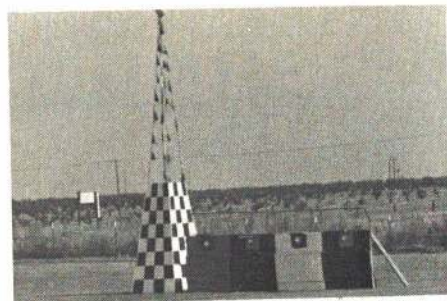
## BOB STOCKWELL ON RC

**From Mile Square to Bakersfield:** Last month I reported the results of the first Southern California Formula I race of the season—an excellent event with winner Kent Nagy setting a new pylon speed record of 1:22.1. At the time I thought that since the flying was in cool and overcast weather, by the time we got to the hot, early June weather at Bakersfield we would be breaking 1:20 for sure. It didn't work out that way.

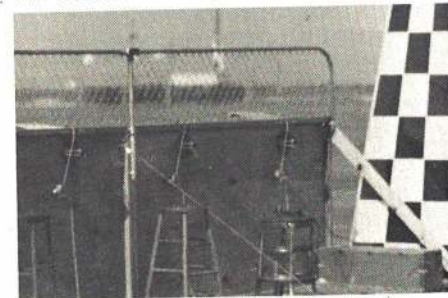
At the Valley Flyers Race at Fountain Valley's Mile Square (where the NMPRA Championship Race will be held over Thanksgiving), winner Whit Stockwell came through with another consistent performance (he had been second to Nagy in the first race) with a best time of 1:24.9. That was also the best time of the contest, shared by Bob Smith.

After the first contest had been virtually accident-free, everyone was convinced that the new safety precautions had paid off handsomely. At Mile Square, however, a dozen planes wiped out, including three in mid-air collisions. The system of flying expert only against expert, novice only against novice, makes for many more tight races, but inevitably increases the mid-air collisions potential.

Every flier among the top ten in the Valley Flyers meet had a best time below 1:30 and six of them at 1:26 or better. The top two, Stockwell and Nagy, flew stock Stafford Minnows—straight out of the kit and powered by K&B Schnuerles. The third, Bob Smith, had his familiar Miss DARA with a K&B. In fourth place, the Supertigres broke into the ranks with Joe Foster's fast El Bandido. His engine is one of those worked over by Ron



Glen Spickler's new light system. The bottom of light panel drops down to display cuts (above). Very high visibility, easy on workers. The workers are always seated behind barrier.



The winner at Bakersfield—Leonard (right) first, McCan (left) second, Smith third after crash.

Walt Schroeder presents first place Standard Class trophy to Murphy (right) and Von Adelung (left), the oldest pylon competitor we know.



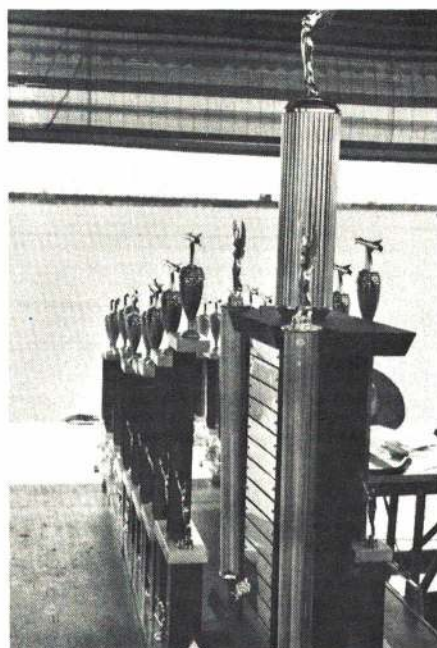
Winners at Valley Flyers—Whit Stockwell first (in middle), Kent Nagy second (right), Bob Smith third (left).

Sheldon, who was also extremely fast though excessive cuts took him down to 10th. Terry Prather took fifth with his Aldrich Tigre.

This race produced the worst crash since last year's Nationals when Bob Reuther lost radio and crashed into the ready area. Jeff Bertken was flying a Minnow built and owned by John Brodbeck, Jr. The plane has been flown for a few seasons and has been partially



The Thunder Chicken, designed by Glen Spickler, was built with the aid of Clarence Neufield who also flies it.



The trophies at Bakersfield, the Indianapolis 500 of Pylon Racing.

rebuilt a couple of times. In one of the toughest races of the day, Jeff was attempting to knock Whit Stockwell out of first place. Bob Smith was calling for him. The airplane had been squirrely in an earlier heat when Jeff had done some fancy aerobatics around pylons two and three. This time he over-rolled coming into two and pulled straight into the ground in the very midst of the pilots and callers. Whit was ahead of him by about a quarter of a lap and we were already facing the scatter pylon, so we just heard it hit directly behind us. The engine just missed me and smashed into the protective panel in front of the counters. The whole plane missed Bob Smith by no more than a foot. I don't think it was a case of pilot error at all. (Bertken is much too good a pilot.) It is more likely that one of the controls, aileron horn perhaps, popped loose. The plane was totaled so we'll never know.

Another crash occurred also in a race with

Whit where the competition was simply trying too hard to catch him—in this case our good friend, Southern California NMPRA Vice-President Chuck Smith. He pulled his Miss DARA flat-out into pylon three trying to turn even tighter. Had he been higher, he would have sustained only a cut; low as he was, he wiped out the airplane. Someone said afterwards he was ahead of us when it happened, but since we had already flattened out from the third turn, we were faced toward one. So we didn't see Chuck's crash, we only heard it hit. I think that report must have been based on wishful thinking.

Of the three mid-air collisions, one was inexcusable. There are some you can't avoid in fast tight races. When you're two laps ahead of the competition, however, there is no excuse for running into them, even going for a fast time, as Larry Leonard was when he ran into Novak.

With this set of disasters behind us, we headed for Bakersfield three weeks later to the race that has become the Indianapolis 500 of Pylon Racing—the BARKS event. Jointly sponsored by MAN at the Famosa Air Field,

Whit Stockwell second in first race of season, first in second race. K&B Schnuerle, Stafford Minnow, exceptional scale finish and trim.



It is run by Glen Spickler with the help of the most able and willing crew I have ever seen. It is just impossible to say enough good things about how well they run a contest.

There had been 64 entries at the first contest at Mile Square and 62 at the second. At Bakersfield there were 94 pre-entries with 88 actually showing up to fly. Entrants came from all over the West Coast and Mexico. Bob Violett came out from Maryland to fly John Brodbeck Jr.'s beautiful Stafford Minnow that Kent Nogy had flown at previous contests. A few K&B filers were trying out prototypes of the 1973 K&B with the permission of the CD. Since the times on the first day were far from earthshaking, no one seemed to mind. On the second day, when the times got better, they had gone back to the 1972 Schnuerles, and Bob Smith put in a 1:22.2.

In the end, the times on the average were slower than in the first two contests, with seven of the top ten below 1:30 and one of those almost certainly a nine-lap time. Finally it was a fly-off between Larry Leonard, Dan McCan, and Bob Smith. Smith crashed after getting caught in the turbulence from McCan and Leonard just ahead of him around pylon three; Leonard won the remaining race against McCan. Smith took home the spectacular new perpetual trophy for best time at Bakersfield, personally donated by Glen Spickler.

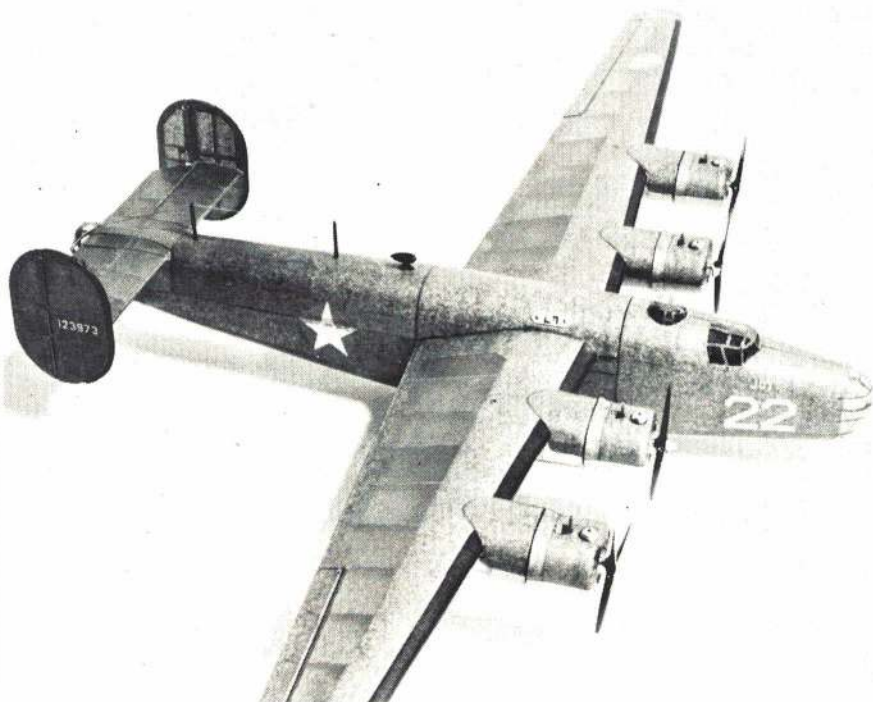
Perhaps the most welcome sight at the Bakersfield event was Ed Von Adelung being awarded the first place trophy in the Standard Class, along with his partner Mr. Murphy. Ed is one of the oldest active competitors in pylon racing. I don't know how old he is, and I'm not about to hazard a guess, but I can assure you that most of us will be in wheel chairs at that age.

I had a gentleman's bet with Ron Schorr that we would not break 1:20 by Bakersfield. It wasn't originally a gentleman's bet, but a money-type bet. It was reduced to zero when we disagreed on the interpretation of the phrase "by Bakersfield." I understood it to mean "before Bakersfield" and Ron read it as "by the end of the Bakersfield race." To my surprise, I turned out to be right and we didn't break 1:20. But I can't believe it won't happen before end of summer.

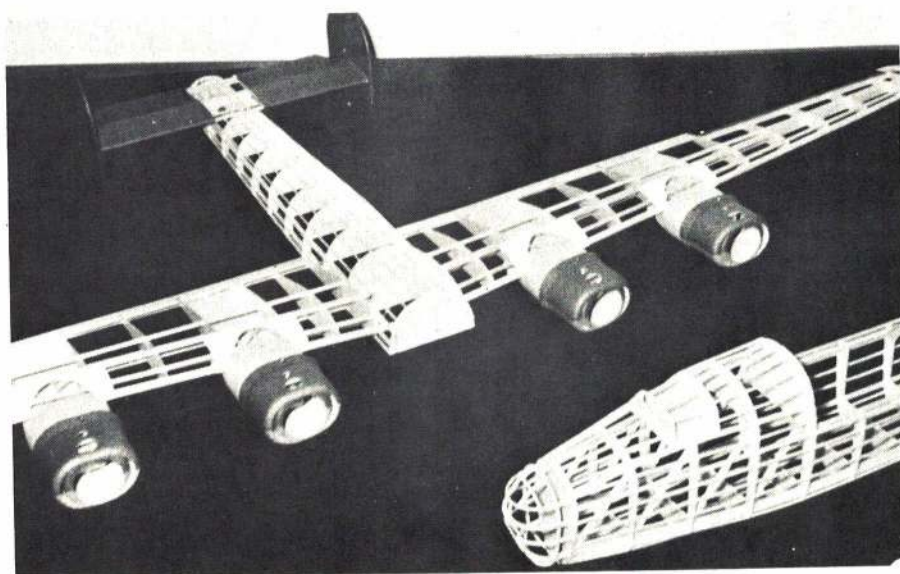
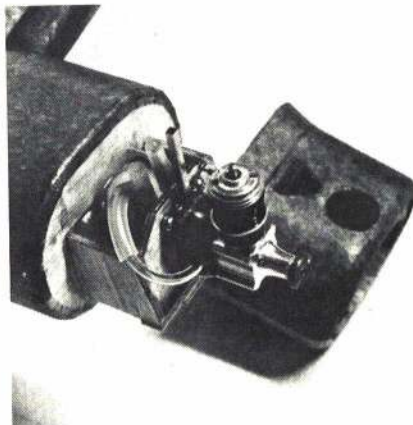
One Final Note: I have heard that in the East, Formula 1 Pylon is going down the drain. I'm distressed to hear it. It is the most sophisticated, highly-developed, exciting, and satisfying event in RC Competition. I hope the great Eastern competitors like Cliff Telford, D.C. May, Bob Violett, and dozens of others will do what they can to put it back on its feet.

# THREE-CHANNEL B-24

SPORT MODELS  
A NEW SECTION FOR ALL TYPES  
OF FUN FLYING MODELS.



Above: If modelers were not so nutty, there could not be such fun models. Mottled look is from the colored tissue covering. Right: All it needs is four of these. Tank is in the nacelle giving ten-min. engine runs. Below: See, that's all there is to it. It is just like a Cleveland kit before covering.



Would you believe—a 55" wingspan, four-engine, radio controlled, three-channel Consolidated B-24D Liberator with an all-up flying weight of just 36 oz.? This particular Liberator was an early production model from the San Diego factory and saw service with the 28th Bomb Group, 11th Air Force in the Aleutians.

I have always wanted a multi-engined model, but never could find a reasonably priced kit or one close enough to scale to suit my needs. Everything about this aircraft seemed to fit what I had in mind—at 1/2" scale the wingspan is 55", compact enough to fit in almost any trunk without removing the wing section, making it a simple task getting to and from the field. By keeping the construction very light, four 020 Pee Wee RC engines furnish enough power for a realistic and responsive flyer, and at a relatively low cost. The high wing and motor configuration allow the use of skids for landing without snapping props and that means wheels up performance in the air without the need for the retract gear, extra channel or heavier construction to accommodate them. Takeoffs are accomplished with a dolly or by hand launching; landings are much easier on a grassy area but are also possible on blacktop.

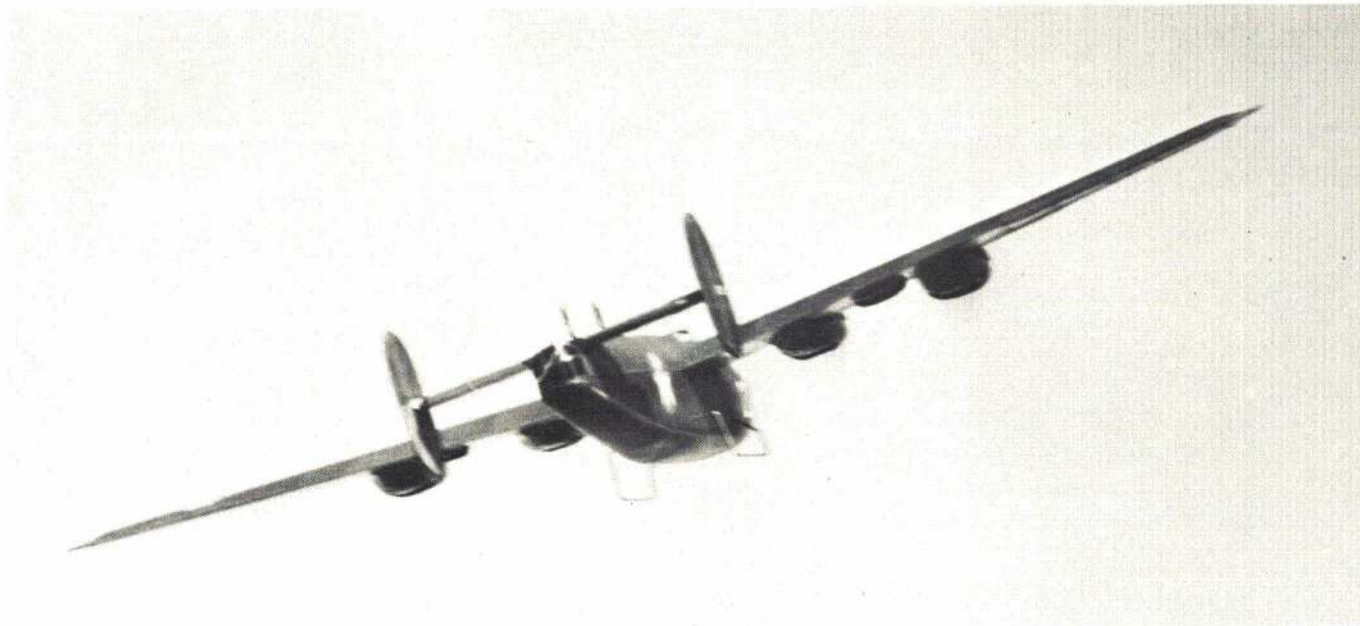
I thoroughly enjoy "building" a model and this type of construction is, in addition to being extremely lightweight, very satisfying to the meticulous builder and easily reproduces scale contours. You might say it is the other end of the stick from the slab-sided or high performance jobs. This model is exact scale in all proportions except a slightly modified airfoil. The covering material is Marlow Jap tissue which is available in olive drab, neutral grey and black and finishes nicely with two coats of Sig Lite-Coat dope.

The radio used here is a Digit Migitt three-channel, controlling throttles, elevator and coupled aileron and rudder. Four servos could be fitted in the available space, and I doubt that the additional weight would seriously affect the performance. Since installation requirements for different radios and personal preferences are so varied, I have only briefly covered the actual component installation in the text, but the photos show how mine was done and it works quite well. The battery pack can be shifted forward in the fuselage to change the CG which is shown on the plans at the furthest aft position which is safe to use. A 1/4-1/2" ahead of this position is all to the good.

Assuming you have adequate tools and equipment for building, the construction of this plane is quite simple and follows the procedures for any stick-and-tissue airplane (remember the old Cleveland kits?). I like to use Handi-

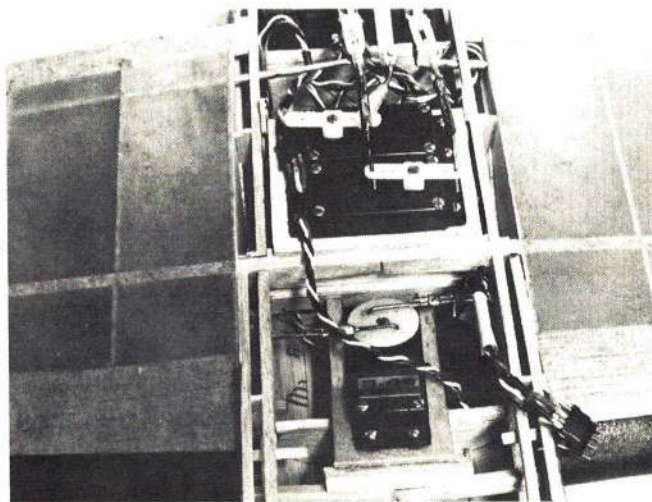
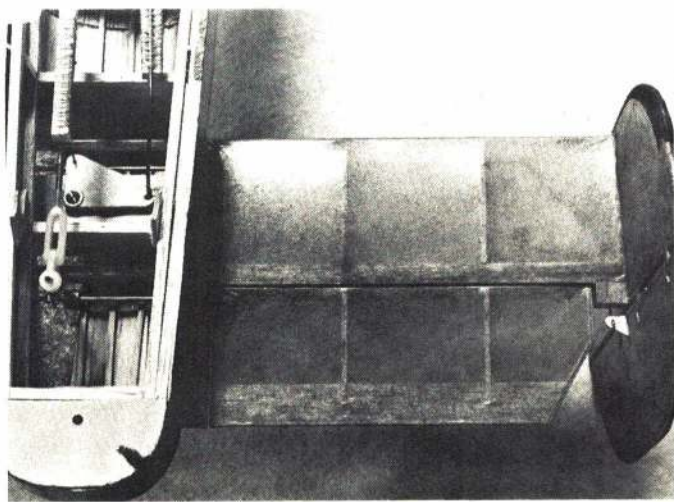
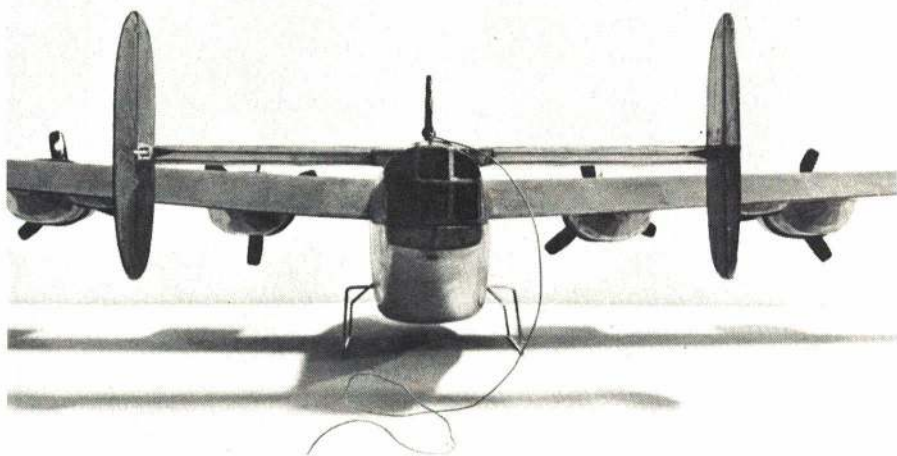
Plans on pages 46 and 48  
Text continued on page 91

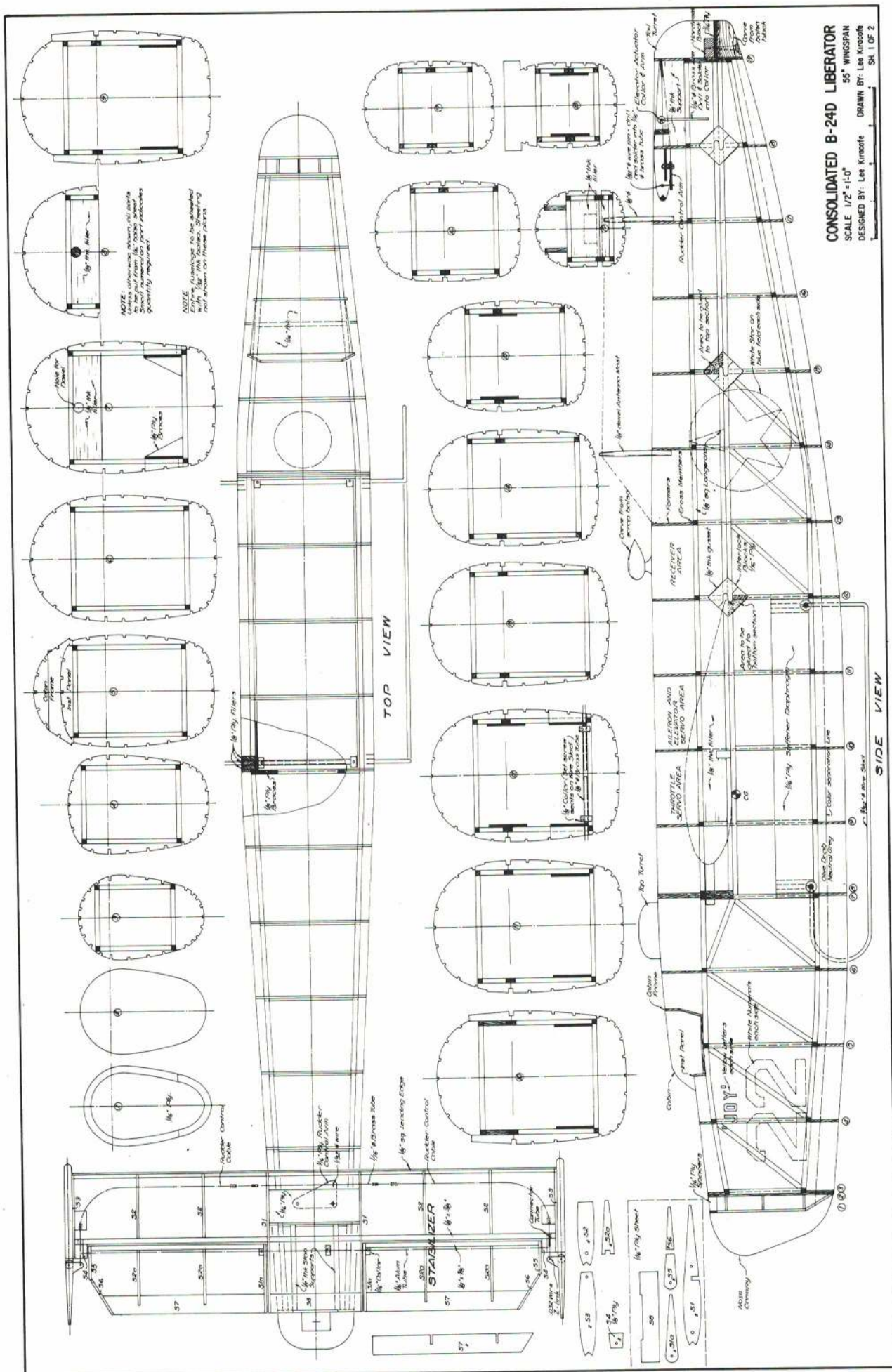
A nearly five-ft. span Sport model for fun flying has four snarling Pee Wee 020s. It could even win a Stand-Off Scale meet—if you don't mind hand launching. / by Lee Kiracole



*Photo by Monty Groves*

Above: And it flies just great—loops, wing-overs, rolls, etc. are easy. What's more, a school field is suitable. Wait till the neighbors see this fly past! Left: Just the south end of a northbound B-24D. Below left: At the tail a bellcrank system controls the twin rudders which are coupled with the ailerons. Elevators operate normally. Below right: All the servos are located under the wing. Rear-most servo operates the four throttles.







# CARL GOLDBERG

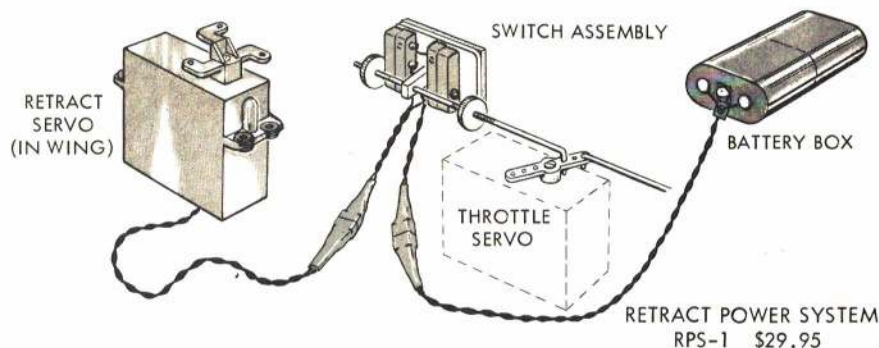
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3. On preparing to land, first bring trim to full retard. When ready, retard throttle stick fully and hold for 3 seconds so gears will extend and lock. If necessary to add throttle to lengthen approach, gears will remain extended.

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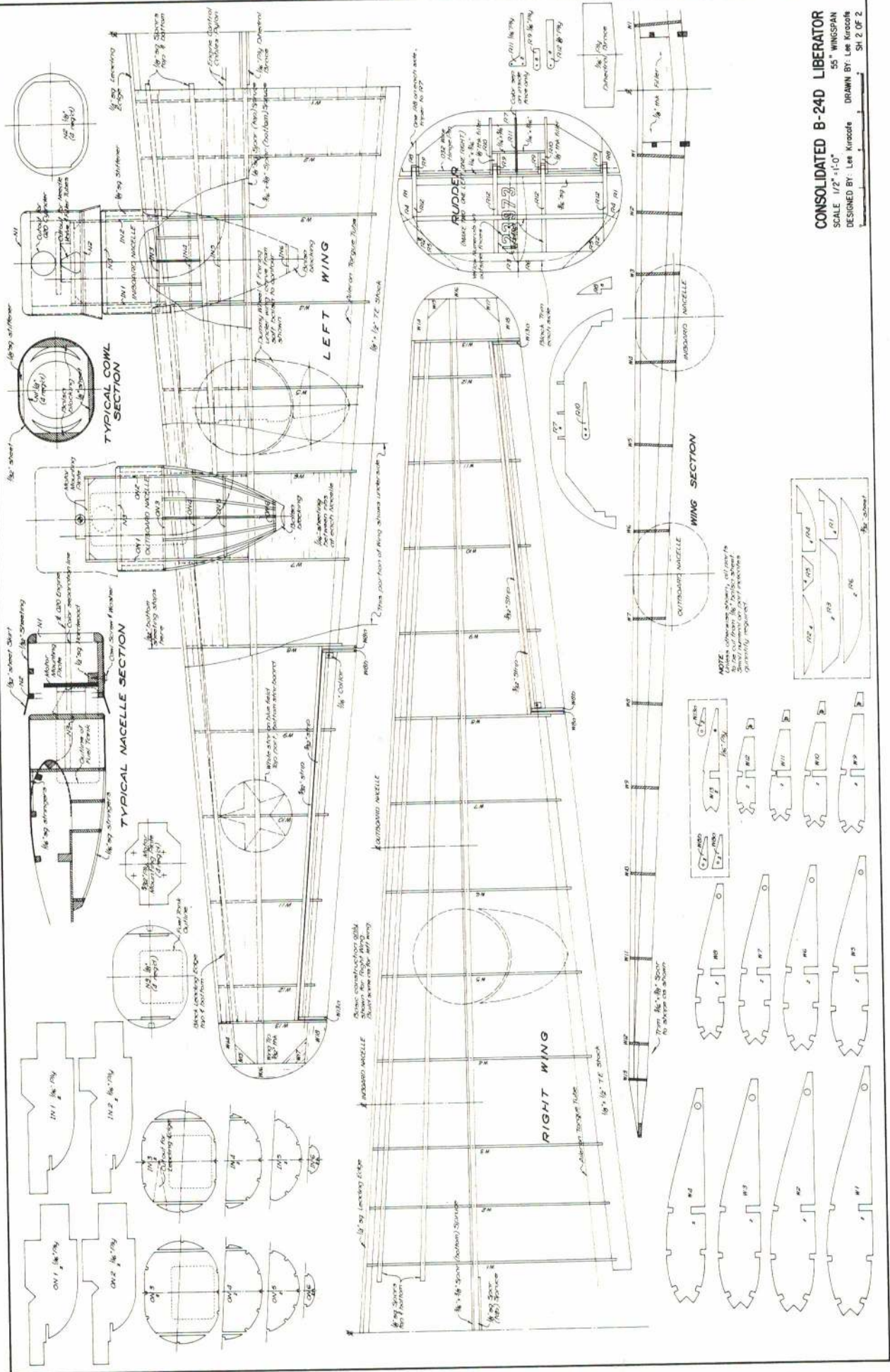
### 4 SIZES

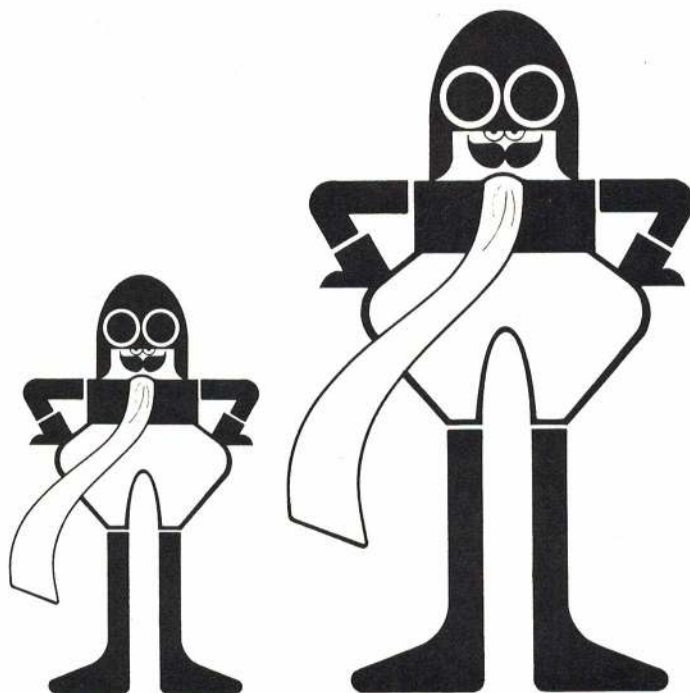
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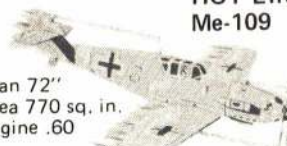
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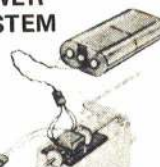
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## JUST RELEASED FALL '73 CATALOG

The Fall '73 catalog is twice as big as the Spring '73. Over 75 manufacturers of kits, radios, engines, and accessories at the lowest prices anywhere! Send 25¢ (mailed bulk rate). For first class mailing, send 50¢. FREE WITH ANY SIZE ORDER

## FULLY ILLUSTRATED!



In addition to all the items listed and pictured in this ad, TOWER HOBBIES carries all of the following lines: Andrews Aircraft, Lanier, Austin Craft, Du-Bro Accessories, Dremel, Fox mufflers, plugs, and engine mounts, Goldberg accessories, Hobbypoxy, Kavan electric starters, Midwest spinners, Perry carburetors, Rnbart accessories, Semco mufflers, Sonic-Tronics accessories, Sullivan fuel tanks, Tatone mufflers, Titebond Glue, Top Flite Props, Universal Wheels, X-Acto tools, Kraft and MRC radios, and several imported helicopters. All are in our new Spring '73 fully illustrated catalog — at the lowest prices, of course!

## CARL MARONEY ON RC

'Tis The Season: June, July and August provide East Coast fliers with a heavy schedule of contest activity. The East Coast Soaring Society (ECSS) alone holds nine meets sponsored by various RC clubs up and down the coast, ideal thermal conditions permitting. Members of the ECSS circuit compete for trophies at meets open to all AMA members.

At every meet each ECSS participant receives a percent score which goes toward his final tally. The top flier is given 100% regardless of his final score; each ECSS contestant's score is converted to a percentage based on his total winning points against the winner. At the close of the season each member's best four meets are averaged to determine his overall standing. This system, in effect for three years, seems to be accurate in selecting the most proficient flier. (The Mid-America Soaring Society [MASS] has also adopted the system in selecting its season winners.)

Ray Smith conducted what will probably be the single largest Eastern meet this year at the DC/RC meet on June 3 with 63 entrants. Contestants from Connecticut, Michigan, New Jersey, Maryland, Virginia and Delaware competed in four rounds in 90° temperatures. Thermal activities were extremely good with seasoned pilots getting flight times near the ten min. maximum.

The flight finish is most important in determining a contestant's score. The object is to touch down at exactly ten min. and be in the landing circle for 50 extra points. In 1971 Ray Smith was the only contestant to get a perfect flight worth 650 points. Pilot skills in general have improved over the last two years. However, a perfect flight, while seen more often, is still a difficult task.

Tom Kelly, better known to his fraternity brothers as "Ole Soar Head" flew his original design, Big Windy, which won him first in the static competition at Toledo. Big Windy proved her worth once again; Tom took a command lead to win the top position. Kelly's performance left Otto Heithecker to accept second place for a silver medallion; Tom proudly received the gold medallion at the awards ceremony.

A Junior category was initiated this year at the DC/RC meet. Jason Josaitis and Tom Kelly shared the winners' circle. In addition to the winners, the other contestants displayed some fine piloting skills. It looks as though we will have some great soaring competition in years to come.

The ECSS banquet held at Dover, Delaware on June 16 was this year's highlight. The banquet is arranged in conjunction with one of the ECSS meets so that as many members as possible may attend. Every year the top ten ECSS competitors are honored. The 1972 ECSS Grand Champion was Otto Heithecker who had demonstrated his expertise meet after meet. Following in the championship lineup were Sherman Lester, Don Goughnour, Percy Pierce, George Durney, Jack Alderson, Don Clark, Clive Sadler, Bob Waldhous and Gene Fuller. Congratulations to all of you!

Through the efforts of Banquet Chairman Herschel Terry it was the finest buffet dinner we have ever attended.

ECSS President George Durney presented a special award to yours truly (me) in appreciation of my services as the first president of the ECSS for a two-year term and editor of *Sailplane*. I was extremely honored to receive this award and will display it proudly.

On June 17 the third ECSS contest was sponsored by the Dover Mosquitoes Club who established a "new frontier" in the words of CD George Durney. It has rained at this an-

Jack Alderson (r) and his Grand Esprit poses with Bob Waldhous and his Mini-Esprit.



The traditional DC/RC Gold Medallion for first place went to Tom Kelly with his original design, Big Windy.

nual soaring contest for the past three years and local members feared that the trend would continue. In spite of overcast skies and light winds, organizers were able to get 47 contestants through five rounds with only an occasional sprinkle of rain. Contestant flights were below five min. durations as man and machine tried to combat marginal lift, varying winds, and spasmodic ground turbulence. Otto Heithecker made the longest flight in round five with a seven min. 29 sec. flight and grabbed the spot for 50 extra points.

Over \$600 worth of awards and merchandise were presented at this contest. Heithecker received a sterling silver bowl for first place; smaller bowls were awarded to second through fifth place winners. In addition, a choice of various merchandise selections could be made by first through 40th place winners. Also, the Dover Mosquitoes sponsored a Junior category trophy won by Steven Harrison (Berkeley Heights, New Jersey) who flew an original design glider.

## BOB MEUSER ON FF SPORT

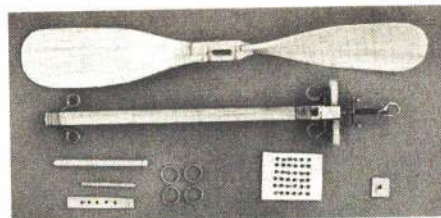
Torque, Turns, and Gears: V. E. Johnson's book on model aviation published in 1910 is the earliest in my collection. Johnson devotes several pages to geared rubber motors. Each of Frank Zalc's early Model Aeronautic Yearbooks has at least one reference to geared motors. Throughout model aviation history there seems to be the feeling that putting a gear set between the prop and motor, or gearing several motors to a single prop, can somehow increase flight duration. Practical applications, however, have been few.

In an article in *MAN* (April, 1965), I presented a summary of the characteristics of many types of gear systems. The article apparently had a tremendous impact on the sport—I haven't seen or heard of gears being used in competition since!

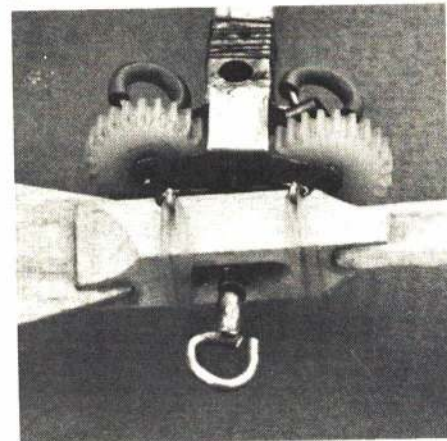
Recently an ad appeared in *AAM* for a geared rubber motor system. I immediately ordered one out of curiosity, and continued to do a little more head-scratching on the subject. Here's what I discovered.

Energy—the stuff flight duration is made of—is proportional to the average torque multiplied by the number of turns. Gearing will change the torque and turns delivered to the prop, but it will not increase the product of torque and turns. Actually, the energy delivered to the prop will be decreased, typically by 5%, because of additional friction. The shape of the torque-turns curve will not be changed significantly either. Stated another way, the torque and turns of any geared motor system can be duplicated by a single ungeared motor of the same weight, provided the number of strands and motor length are selected properly.

So, gears are pretty worthless, right? Wrong! Gearing can be utilized to permit a greater weight of rubber to be carried in a given fuselage length; this results in more energy and greater potential duration. For scale or sport models where fuselage length is relatively short this can be important. Of course rubber weight can be increased by increasing the number of strands, but that requires a larger prop. And if a flying scale model doesn't already have the largest prop it can



Gear system by Crow Hill Models gives 126% increase in motor-run time with the same torque to the prop as single motor. Ideal for scale models of about 20-in. span.



handle, it isn't designed properly. For a Wakefield or Coupe model where rubber weight is limited, gearing offers no advantage.

Let's examine the Crow Hill Models unit shown in the photos. Two motors are connected in parallel to the prop through a 2.4 to 1 speed-increasing gear set. Wide-face nylon gears, backed by ball thrust bearings, drive a brass spur on the prop shaft. A rubber tensioner and a free-wheeling device are provided. A roughed-out prop is supplied. A slot in the prop hub allows the prop to be slipped over the winding loop on the prop shaft, and the prop is secured to the unit with two small rubber bands. This feature allows the prop to be removed during winding, and reduces damage in the event of an unscheduled hard landing.

The unit is supplied with a good old-fashioned motor stick to permit winding the motors outside the fuselage; it is a bit short, but a longer one can be substituted easily. Stretch-winding both motors simultaneously from the front, through the gears, is possible but with a little difficulty. With the motor stick removed from the fuselage, winding from the rear is easily accomplished with the aid of S-hooks. The unit has a distinctly homemade look, but the workmanship is good.

Suppose you have a scale or sport model that flies well on a conventional single motor. Install the Crow Hill unit, use the same prop, and make each of the two motors 13% larger in cross section than the original single motor by using wider or thicker rubber or a greater number of strands. The torque delivered to the prop will be the same, while the total weight of rubber and the number of turns of the prop will be increased by a factor of 2.26. That doesn't mean that the duration will more than double, because the weight of the model will be greater. However, the rubber motor in a scale model rarely constitutes more than about 15% of the total weight, so even increasing the weight of the rubber by a factor of 2.26 increases the gross weight by only 20%.

Then there is the additional friction of the gears, and the weight of the gear unit itself, but ballast must often be added to the nose of a scale model anyway. If it is used properly, the Crow Hill unit should add 50% to 100% to flight duration.

The unit will accommodate four strands of 4mm Pirelli on each motor and weighs 1/3 oz., motorstick and all. It is intended for models with about a two-ft. wingspan of conventional stick-and-tissue construction. Price is \$7.50. Crow Hill Models, Box 37, Mill River, Mass. 01224.

(Continued on page 109)



Bob Harrah designed and photographed this outstanding FF power model—the "HO HO" 1100/40.

# pulse commander Price Reduction!

Sales for the Pulse Commander have continued high, and since we are also buying additional components for the Digital Commander, we are getting volume price breaks. We have also become more efficient in our line assembly. As a result we've come up with savings--and we're passing them on directly to you!

The Pulse Commander has the same high

## THE SIMPLE SYSTEM--

--From 2.5 oz.

--WITH Nicads and Charger

## RUDDER-ONLY PULSE IS:

- \* **LIGHTEST WEIGHT**--2.5 oz. for Baby.
- \* **LOWEST COST**--WITH airborne nicad batteries and charger--begin at \$59.95!
- \* **SIMPLEST**--only one moving part, easily serviced and maintained; noise free.
- \* **VERSATILE**--Arrange to suit your particular installation. You can go up or down in size without obsoleting receiver or transmitter. Simple changes of battery pack and actuator allow change.
- \* **FULLY PROPORTIONAL**
- \* **INTERCHANGEABLE**--Plug-in wiring allows quick switching of receiver from plane to plane.
- \* **INEXPENSIVE**--Initial cost of system, air-plane, and engine is low; one transmitter and receiver can be used for many different styles and sizes of planes.
- \* **SIMPLE**--Easy installation; actuator has one moving part. Minimum maintenance.
- \* **GREAT for Beginners--FUN for Experts.**

## TOTAL Flite Pak Weights--

Unit	Weight	Recommended
Baby	2.5 oz.	Pee Wee .020 Up to 48" gliders
Baby Twin	2.7 oz.	Tee Dee .010-.020 Up to 72" gliders
Standard	3.7 oz.	.049 to .10
Stomper	4.1 oz.	Tee Dee .049-.23

**IMPORTANT:** You can save an additional weight on the Standard and Stomper packs by using the Ace 225 ma Stack Pak (38K37) instead of the 500 ma buttons which are supplied. This will come up to weights of 3 ounces for the Standard and 3.4 ounces for the Stomper. This Stack Pak will give you one hour plus flying time between charges. Specify on your order

quality that thousands of R/C modelers have come to respect, with topnotch excellence of performance. Features the Drain Brain for less receiver-actuator drain; more transmitter power output; four sizes of powerful magnetic actuators to choose from.

Join the thousands who fly the Pulse Commander "Just for Fun"!



## pulse commander R-O Systems

Completely wired, tested and guaranteed with airborne battery pack and charger, but less transmitter battery.

10G 15--Baby System	\$59.95
10G 15T--Baby Twin System	62.95
10G 16--Standard System	61.95
10G 17--Stomper System	64.95

26.995, 27.045, 27.095, 27.145, 27.195

Please Specify Frequency

## SELECTION OF PLANES FOR R-O PULSE

There are many good plane kits on the market for the Pulse Commander. In addition to the Ace Foam Wing Dick's Dream, Ace High and Skampy, there are the House of Balsa Nomad, Micro Models Replica Old Timers--Super Buccaneer, Mercury and Miss America, Sterling's Cirrus and other kits in their line, Dumas Mod Pod, also kits by Goldberg, Midwest, Top Flite and others. Kustom Kits will soon be having their RCM Javalero.

Many builders are designing their own small ships using the Ace Mini Foam Wings.

Dear Friend:

Biggest news this month is that the Commander packages have been reduced by \$10.00 over the old price!

Not only has the demand continued high, but we've also been making more kits for our Digital Commander. This has meant that we've been able to pool our buying for greater quantity price breaks.

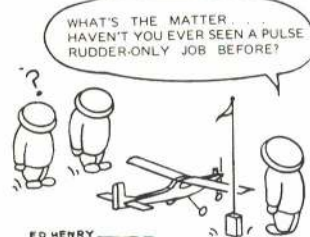
We've also refined our assembly procedure and made it more efficient--and thus also effected additional savings. We're passing the savings on directly to you!

There are absolutely no compromises in the quality or excellence of performance. Same dependable Drain Brain, which results in the current saving as used in the receiver-actuator, same potent transmitter output, and the same choice of four powerful magnetic actuators.

Why is Pulse still going strong? Seems that many oldtimers are coming in for an extra "FUN" ship. Warranty sheets that are returned indicate that many of the present Pulse Commander purchasers already own one or more of the high priced spreads. As one oldtimer put it: I want the Pulse Commander "just for fun"!

They also say: Pulse Rudder-Only flying is a change of pace. It is relaxing. It's not knee-knocking or nerve racking. You have a wide selection of kits. You don't have to travel miles to a flying site. You can conserve not only travel gasoline, but you get in many flights on ounces--not gallons--of fuel. You can't beat the weights. Simplest to install.

We recently saw a roster of the McDonnell R/C Club. There were 52 members listed with a break down of the equipment they used. Would you believe that they had 14 Pulse Commanders in the listing? That is over one-fourth of the membership! That's what we'd call a pretty solid recommendation!



Pulse Commanders have proven their dependability--because we insist that you use nickel cadmium batteries in the flite pack, and therefore never need worry about how old pen cells are. Even the charger for the Nicads is furnished in the low price. Figure this in when you do comparison shopping--our combo prices INCLUDE a Nicad battery pack and charger. The only extra needed is a readily available 9 volt dry battery for your transmitter.

Join the crowd; Fly the Pulse Commander -- the simple system -- "Just for Fun"!

Our Digital Commanders are moving out at a good clip. We want to thank all of the satisfied users who have written us about their successes. Also for their comments that the receiver is one of the best available. Fred Marks is working on a 3 and 4 channel transmitter conversion, as well as a new 6 or 8 channel transmitter. We'll have more on these as soon as we get a little closer to release date.

On the Digital Commanders, we've been plagued by delivery delays of components. You may have read in some model mags about the electronic industry shortages and delays. They are fierce. Components that used to take only four to eight weeks to get, now sometimes take 26; and in some cases are being promised 52 weeks away! All electronic trade papers point up the shortages and delays. They place the cause to several things: New car models will be using more electronics; The Pocket Calculator boom uses IC's, transistors, nickel cads; Many computers are being installed by Sears and other large department stores, so that every time you make a purchase the computer not only records that purchase but double checks inventory; More hand-held power tools such as lawn trimmers and clippers etc., all take nickel cads. It all adds up to something that apparently none of the electronic manufacturers could forecast.

Yours sincerely,

*Paul F. Runge*  
Paul F. Runge

## R-O PULSE HANDBOOK

WITH

UPDATED CATALOG

Only \$1.00

Refundable First Order

Handbook has expanded data on How Pulse Works, Installation, How to Fly -- and much more. Most complete information on Pulse Rudder. Only available anywhere.

New catalog is completely updated. Includes many items from major manufacturers.

Price is \$1.00 via THIRD CLASS BULK MAIL. If you wish faster delivery, add 50¢ for turn around FIRST CLASS service.

ACE RADIO CONTROL, INC. \* BOX 301 \* HIGGINSVILLE, MO. 64037

NAME _____				
ADDRESS _____				
CITY _____		STATE _____		ZIP _____
QUANTITY	STOCK #	NAME OF ITEM	PRICE	TOTAL

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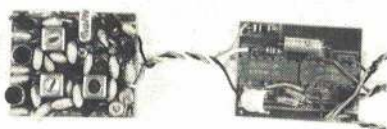
Add \$1.00 shipping-handling for  
direct mailorders except catalog



## digital commander

### KITS

- \* Two channel system using IC's and latest state of the art; may be expanded to 4-6-8 channels.
- \* Receiver-Decoder (2) will work with most modern 4-6-8 channel digital transmitters on same frequency! Reads aileron and elevator signals—ignores the rest.
- \* Receiver-Decoder (2) works modern digital servos.
- \* Receiver-Decoder (2) offer inexpensive way to go with your present system for glider, plane, boat or car: use with extra servos you already have. Or use our combo flite pak: receiver-decoder, two servos, etc.
- \* Available on the following frequencies: 27.995, 27.045, 27.095, 27.145, 27.195, 53.100, 53.200, 53.300, 53.400, 53.500



## digital commander RECEIVER DECODER (2) KIT

IC's simplify wiring and set up of 2 channel decoder. Receiver is exceptional double tuned front end which uses discrete components for the highest selectivity and greatest range. Complete with detailed step by step instructions. Weight of completed receiver-decoder is 36 grams or 1.26 ounces.

No. 12G20—Digital Commander Receiver-Decoder Kit (2) \$27.95  
(Less case, connectors, switch)

Please specify frequency

No. 19L50—Deans 4 pin connector set .95  
No. 40L252—CW DPDT Slide Switch .59  
No. 30L21—Switch Guard for above .39  
No. 21K30—Formed ABS case for Receiver-Decoder. (All models) 2.00



## digital commander SERVO KIT

Housed in the D & R Bantam DS3P mechanics, uses WE 3141 IC for ease in assembly. Kit contains motor, pot, wiper and all components required, with step-by-step manual.

Weight for the DS3P servo is 37 grams: 1.3 ounces. With the DS2P servo, 44 grams: 1.55 oz.

No. 14G20—Digital Commander Servo Kit \$21.95  
No. 14G20L—As above, except with D & R DS2P Linear Mechanics (Less connectors) 22.95

## digital commander FLITE PAK KIT COMBO (2)

If you intend to use Commander Digital (2) with your multi digital transmitter, all you need are the receiver-decoder and 2 servo kits. Combo offers savings over kits purchased individually. Includes 3 connectors, switch, hookup wire for cabling. Everything you need to make complete 2 channel-2 servo pack for your sailplane, boat or car, except batteries.

Weight of the complete 2 channel Flite Pak, including ABS case and connectors and switch, but less batteries, is 113 grams or 3.9 ounces.

With 225 ma SCL batteries, 160 grams or 5.64 ounces.

As above, but with 450 ma SCL batteries, 190 grams or 6.7 ounces.

No. 12G30—(2) Flite Pak Combo \$64.95  
No. 12G30L—As above, but with D & R DS2P Linear Mechanics 66.95

Please specify frequency

## NEW! digital commander (1-8)

### RECEIVER-DECODER KIT

### Up to 8 Channel Capability!

Here is the Ace Digital Commander (1-8) Channel Receiver-Decoder Combo. This is the ultimate of the 2 channel system developed by Fred Marks, which received a great reception and met with fantastic success in the field.

Voltage regulator has been added to replace original filtering of power supply—this results in outstanding improvement of performance. With the new decoder you have your option of going with 2, 3, 4, 5, 6, 7 or 8 servos—whatever your transmitter provides.

The Ace Digital Commander Receiver-Decoder Combo will work with any of the present day transmitters available, provided they are on the same RF frequency. It will not work with the Jerrobee, ACL Digilog, or Digitrio.

The unit is just as simple and easy and straight forward to wire as the 2 channel. The secret is using IC chips.

May be used with the Ace Digital Commander servos or any positive pulse servo. Provisions for three or four wire output from the decoder.

Unit in its vacuum formed case measures 1.45 x 1.72 x 1" deep. Weight of the receiver decoder is 1.4 ounces.

Kit includes ABS formed case. No connectors are furnished. Step by step instructions.

No. 12G18—Digital Commander (1-8) Channel Receiver-Decoder Kit \$34.95

\* Available on the following frequencies: 26.995, 27.045, 27.095, 27.145, 27.195, 53.100, 53.200, 53.300, 53.400, 53.500

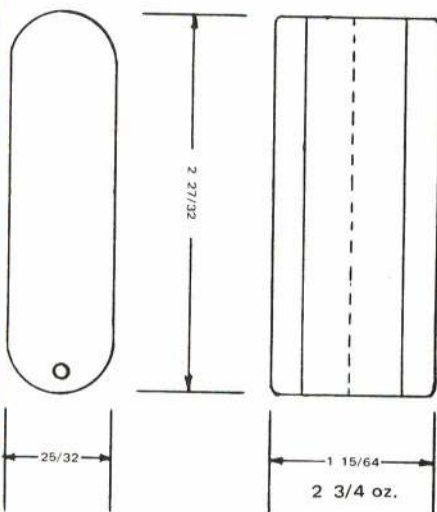
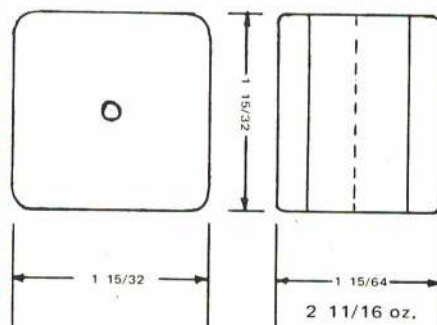


## ALL STAR

### BIPLANE KIT BY ROMAN BUKOLT

Uses two sets of Ace Foam Wings for ease of building. For use with .09 to .15 power and 2 or 3 channel digital. Do NOT overpower! Beautiful Experimental Aircraft Association type plane.

131200—All Star Deluxe Biplane Kit \$21.95



## NEW 4.8 VOLT BATTERY PACKS

Using the new Gould National-Burgess 450 SCL battery, which is sintered and vented, and probably one of the highest performance type batteries available to the R/C modeler today, Ace now is proud to introduce 2 battery pack configurations using four of these cells for 4.8 volts for digital systems.

These are center tapped for use with older systems, although most current systems use only two leads.

Available in either a Square Pack or a Flat Pack, depending on your installation.

The Square Pack measures 1 15/32" square by 1 15/64" tall. Weight is 76 grams or 2 11/16 ounces.

The Flat Pack measures 2 27/32" long, is 25/32" wide, and is 1 15/64" tall. Weight is 78 grams or 2 3/4 ounces.

Housed in vacuum formed case for crash resistance, and also easy disassembly for service if required.

No. 38K56S—4.8-450 SCL Square Pack \$12.50  
No. 38K56F—4.8-450 SCL Flat Pack 12.50



Builds either P51B, Hurricane Mk IIc or ME109E. Designed by Roman Bukolt. Kit contains precision band sawed and machine sanded parts. Portions of the wood are blank to let you make the variations required for model of your choice. Kit uses Ace Foam wings for easy construction.

Each War Bird has a span of 42", and an area of 225 square inches. For docile performance use a Cox Babe Bee or Golden Bee and Pulse Commander Rudder Only. Or use a Tee Dee .049 with a 2 channel digital for commanding characteristics.

No. 13L110—Ace War Bird Kit \$17.95

# U.S. F.F. CHAMPIONSHIPS

In the southernmost corner of California's Sacramento-San Joaquin Valley, nestled in the crook of the arm formed by the Temblor Range and the Tehachape Mountains with 8800-ft. Mt. Pinos at the elbow, lies the small but active town of Taft. Except for irrigated plots under cultivation, the surrounding valley floor is a desert. Principle products of the region include oil, farm goods, a few rattlesnakes, and the biggest, boomingest, meanest thermals imaginable!

After four and a half hours of non-aggressive driving from the San Francisco Bay area, a quick blip off the freeway took me into Taft where "Welcome Free Flighters" banners confirmed that I had made the correct turns. Five miles later I came to what had to be either the U.S. Free Flight Championships, or the Kern County Annual Recreational Vehicle Drive-In. It turned out to be both. Many contestants, some with their families, lived on the field either with campers, motor homes, house trailers, tents, or as in my case, simply a groundcloth and sleeping bag.

The launching area—a square one-half mile on a side—had been graded flat. Downwind the terrain was lumpy, pocked with freshly sharpened bushes, and crossed by an occasional dry creek bed, but easily negotiable on foot or by motorcycle. The Taft Condors and the Taft and Kern County Chambers of Commerce had cooperated to make the three-day stay of the Free Flighters as pleasant as circumstances would permit by supplying porta-johns, a first-aid station, and friendly daily visits by the Fire and Sheriff's Departments.

Attendance was about the same as in 1972: approximately 300 contestants and 700 entries, which makes it by far the largest Free Flight meet in the country, except for the NATS. And this is *real* Free Flight—five-min. maxes. They came from far and wide: Detroit, Phoenix, Dallas, Denver, Huntsville, Chicago, Mexico City, Salt Lake City, Vancouver, Oklahoma City, Seattle. A third of the team that is to represent the U.S. at the World Championships was at hand—Paul Crowley, Henry Spence, Bob White and Team Manager Dave Linstrum.

The most colorful group on the field was the competent five-man Nordic team from Mexico City. Their tastefully designed golden shirt-jackets proclaimed their club affiliation and, in small print, their names—a great help to the modeling press. Their gliders were trimmed to turn in a tight, slightly stalling circle, well-adapted to the boom-or-bust thermal activity. One flier, Jose Luis Ramirez, made it into the 11-man fly-off—no small feat considering the quality of the competition—but crossing towlines with another flier put him out of the running.



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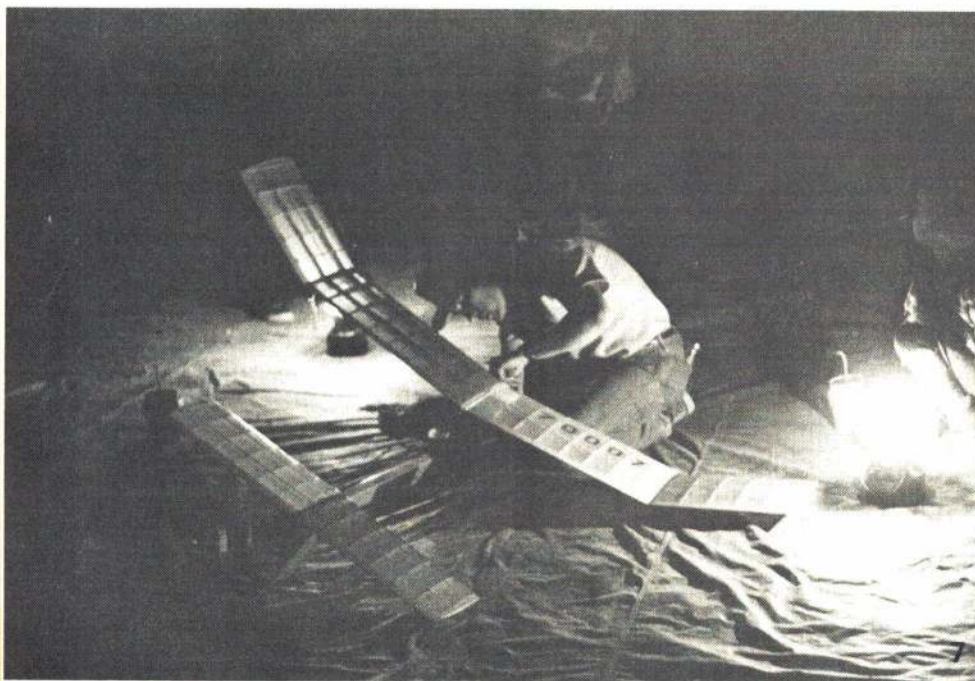


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6

Free Flight is definitely still alive! Over 300 contestants with 700 entries competed this year in one of the largest Free Flight meets in the country at Taft, California. / by Bob Meuser



(1) Ed Carroll topped the list in the five-man all-Northern California flyoff in the FAI-Power event for the second time with his Moonraker design.

(2) Young Randy Bunch fires up his Supertigre 23-powered Schocer 480, a Mel Schmidt design. Randy emerged as Overall Sweepstakes winner for which he was awarded the Chuck Broadhurst Memorial Trophy.

(3) Ernst Johnson, Rancho Cordova, California, won Rubber-Power Old-Timer with this model of Bruce Luckett's 1936 Mulvihill Trophy winner for the second year in a row.

(4) Bill Booth, University of California freshman, won the Rocket-Power event with model made from parts of two others.

(5) Beer cans for the fuselage?

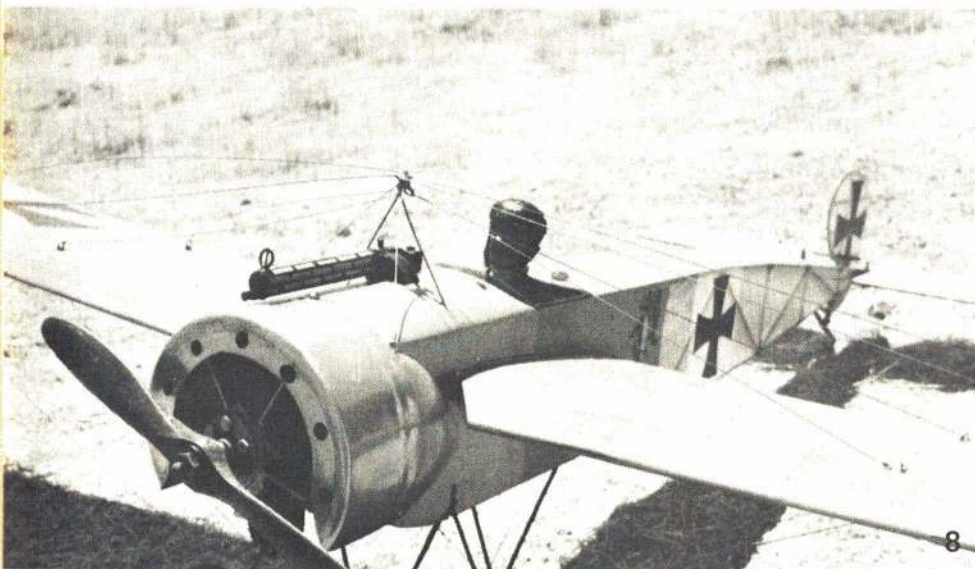
(6) Hardy Brodersen, Executive Secretary of the National Free Flight Society, came with the three-man Detroit team. His original X<sup>3</sup> design with hot Rossi is a fast climber.

(7) Night flying is a popular West Coast event. Flashlight batteries and lamps trace model's path. Satellites flown by Bill and Bob Hunter took first and second.

(8) R.G. "Brick" Brickner's nifty Fokker Eindecker EIII won the Gas-Powered Scale event.

(9) Harold Thomas (at least he claimed to be) devised this unique protective enclosure to beat the heat. Officially it was 102°F in Bakersfield to the north.

(10) Greg Xenakis of San Jose, California, took first in the Junior Hand-Launch Glider, breaking his own national record.



Most of the other fliers maxed on the first flyoff, and it appeared that the flyoffs might continue until dark. In the second flyoff, Walt Ghio started towing at the start of the two-min. launching period, his slack line forecasting that this round would be the last, followed by the rest of the pack a half-min. later. They released, but most of their gliders were already to the ground before Walt, by then a quarter-mile upwind, finally unhooked. His flight appeared marginal at first, but it was soon evident that he had hooked a good thermal. He dethermalized from about 600 ft., adding another first place trophy to his already ample collection.

Bob White, twice a member of the U.S. Wakefield team, doesn't really win every Rubber Power event he enters—it just seems that way. He won Unlimited Rubber with his Twin Fin, one of the National Free Flight Society Model of the Year Award winners, which has frequently set National Records. With his latest Coupe d'Hiver model, Beau Coupe, he put up seven maxes to win that too. Bob displayed a new solid balsa Wakefield wing weighing only 60 grams—less than most sheet-covered wings and as light as some stick-and-tissue wings.

Bob observes that the increased weight requirement adopted last year by the AMA has made this an expert's event. The performance is so marginal that a beginner would achieve little success and derive little satisfaction from building a Coupe; competition success requires sticking one into a good thermal every flight.

Bob Vinson flew another one of his original designs based on the Goldberg Sailplane to first place in A Gas. Bob Critchlow came out of hibernation to win the A/1 Towline Glider event with his own high-aspect-ratio design. Kirk Van Nest kept the family name on the winners' list by placing first in Junior. The new all-sheet high-tail Tadpoles flown by Bill and Greg Xenakis showed promise as an easily built design capable of winning performance.

Last year's winner of the Rocket Power event, Ron Wittman, put his fast-climbing Jetex model into a nice thermal on its first flight and lost it. He flew his remaining flights with a heavy old PAA Jetex Cargo model, landing gear and all, to place third. No one maxed out, so first place was in contention until the final moments.

When a friend ran to tell Bill Booth, Jr. (one of the recipients of the AMA Scholarship this year) that he had won, Bill simply turned to his dad and said, "Well, I really wish it had been you instead." And he meant it. Bill Sr. had lost his model on its second max.

While the Rocket event had its triumphs, frustrations, and pathos, it was not without its comic relief. (I wouldn't mention this incident if it were not the exception to Dave Parsons' usual performance.) Dave fortuitously chose to launch his model directly in front of one of the officials' shelters where a number of his clubmates were gathered. Dave's rocket motor must have had a

(Continued on page 94)





15



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17



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19

(11) Mexico City fielded a competent and colorful five-man Nordic A/2 Glider team. One member made it into the flyoff. Here Jose Luis De Luna launches for teammate Luis Colmenares.

(12) Mel Elkins' own version of a Finnish-design Wakefield. Aluminum tube fuselage, machinist's dream prop hub unit.

(13) Bill Gieskieng of Denver, leading exponent of wing flaps for FAI-Power models in the U.S., flew his latest model with sheeted, silver MonoKote-covered, polyhedral wing.

(14) Gene Wallock took first in 020-powered Old-Timer Replica event with this mini-version of the Ranger, an old Megow design.

(15) Cliff Silva of Livermore seldom misses an Old-Timer event. Model is an American Ace powered by a Torpedo Special 30.

(16) Bob DeShields set a fast pace in Hand-Launch Glider by posting three successive maxes with huge 28-in. glider. Ended up second to record-holder Bill Blanchard.

(17) Versatile Walt Ghio always wins something. This time he was the only Nordic flier to max in the second round in the 12-man flyoff. Ran almost out of sight before releasing in the fiery heat.

(18) Hal Cover's Korda Wakefield flew in the Old-Timer Rubber event.

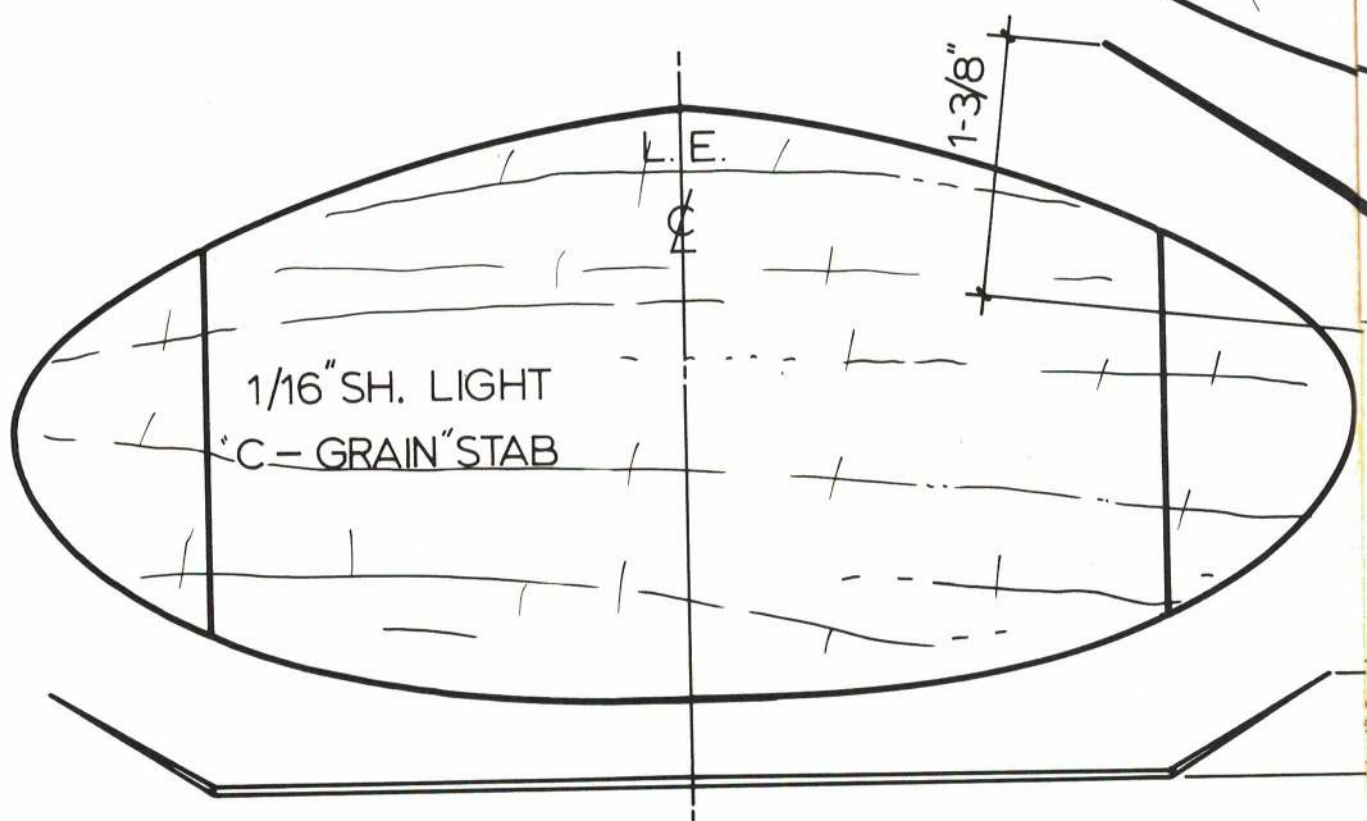
(19) Mike Taibi, Sal's "little boy," and his Starduster 600 pulled by a Supertigre 15.

(20) Bill Chenault came with the Dallas contingent. His Maxi-Pearl 700 sports a rear-rotor Supertigre 40. A future M&P kit?

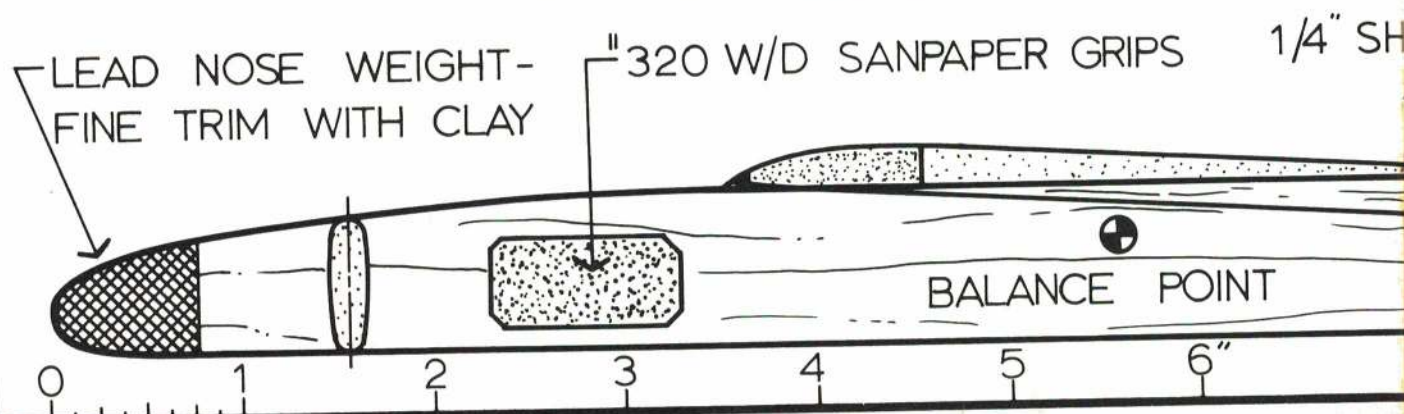


# SLICK STICK

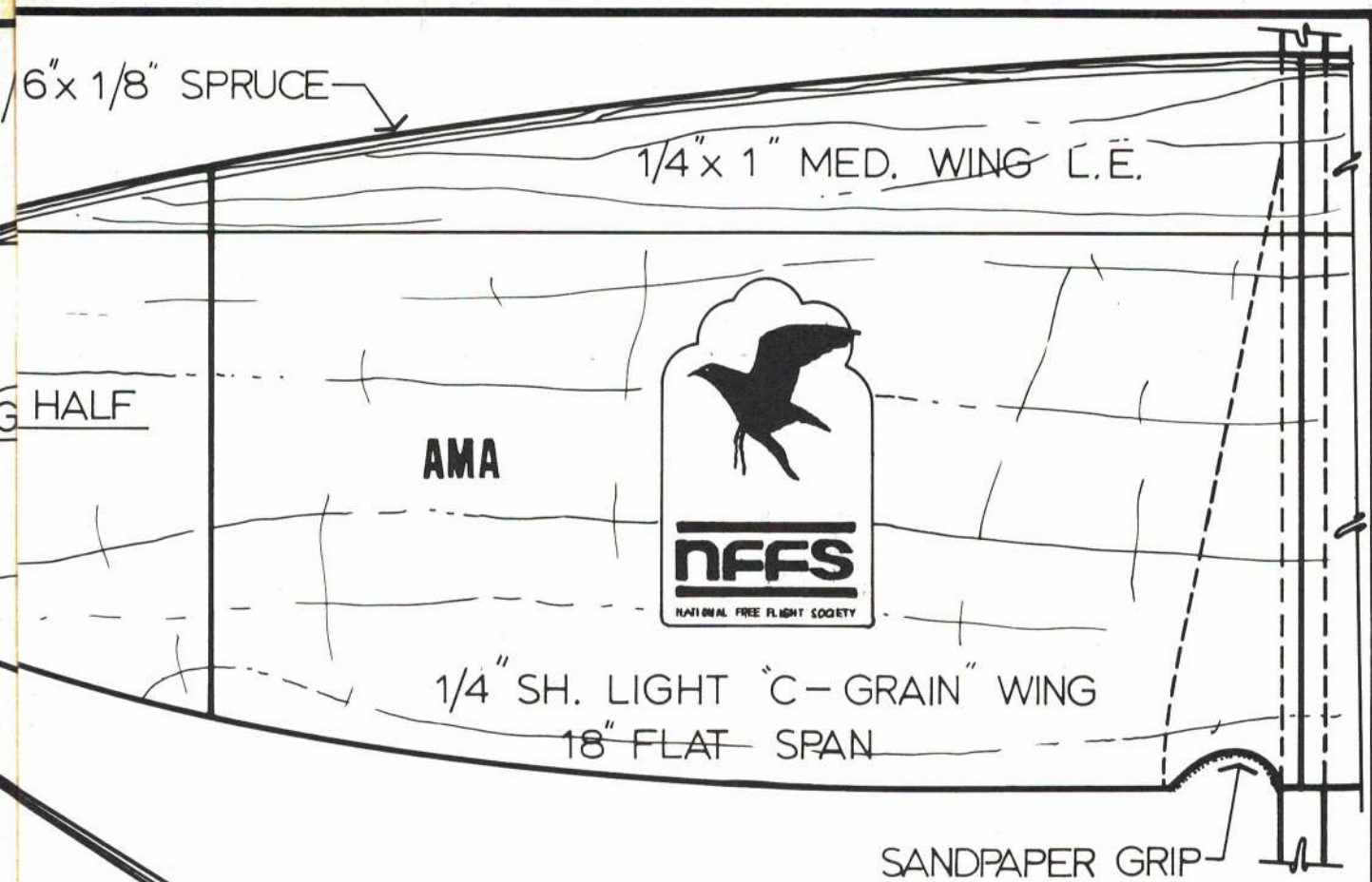
By  
Bill Blanchard



STAB DIHEDRAL



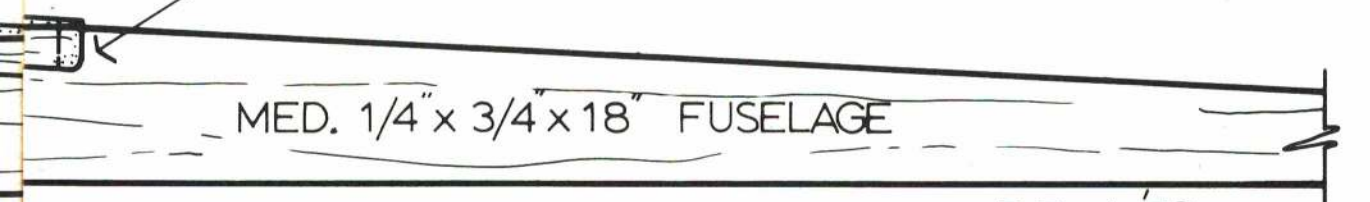
FULL SIZE PLANS



FINISH: 1 THIN COAT SEALER & 3 THIN COATS OF  
NITRATE DOPE OVER ENTIRE GLIDER.



FINGER REST



B.B. 4-73

# THE SENSATIONAL NEW

# KWIK BILT\*

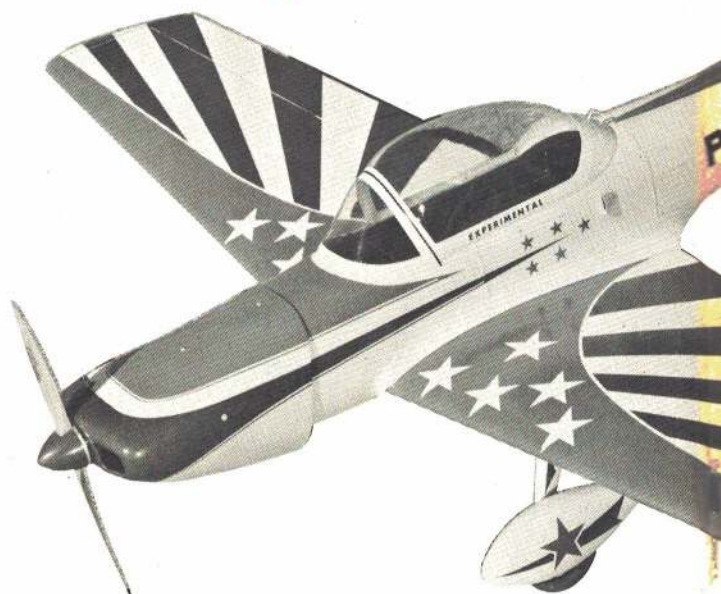
\*Patent 3699706

# R-C Super Chipmunk

Designed by MIKE STOTT

## KIT FEATURES

- \* Formed Plastic Fuselage Halves With Skin Detail
  - \* Rugged Plastic Cowling
  - \* Molded Wheel Pants
  - \* Clear Canopy With Framing
  - \* Precision-Cut Foam Wing Core
  - \* Formed Plastic Wing Tips
  - \* Solid Balsa Internal Profile
  - \* Sheet Balsa Tail Surfaces
  - \* Pre-Bent Torsion-Bar Landing Gear
  - \* Decorative Decal Sheet
  - \* Step-By-Step Instructions With Isometric Drawings
  - \* SIG Quality Balsa And Plywood
- COMPLETE HARDWARE PACK INCLUDES:**
- \* Molded Nylon Control Hinges
  - \* Molded Nylon Control Horns
  - \* Tuf-Steel R/C Links
  - \* Double Coated Servo Mounting Tape



## RC SPORT SCALE & PATTERNS

- \*Flies Like A Pattern Ship
- \*Looks Like A Super-Scale
- \*Builds Fast!

SIG'S TIME-SAVING PATENTED "KWIK-BILT" CONSTRUCTION SYSTEM GETS YOU INTO THE AIR QUICKLY WITH THIS HIGH PERFORMANCE BEAUTY. THE INTERNAL PROFILE STRUCTURE CARRIES THE LOAD OF THE ENGINE AND FLIGHT SURFACES, PROTECTING THE MOLDED PLASTIC FUSELAGE SHELL FROM VIBRATION AND FATIGUE. THE READY-FORMED SHELL GOES ON EFFORTLESSLY IN A FEW MINUTES TO GIVE YOU A SMOOTHLY FINISHED UNIT, COMPLETE WITH RIVETS, SEAMS AND INTEGRAL FILLETS. SUPERB CONTROL RESPONSE BY THIS COMPETITION-PROVEN DESIGN DELIVERS PICTURE PERFECT MANEUVERS. GROUND HANDLING QUALITIES ARE EXCELLENT. A GREAT COMBINATION OF APPEARANCE AND FLYABILITY.



# NEW

# SIG

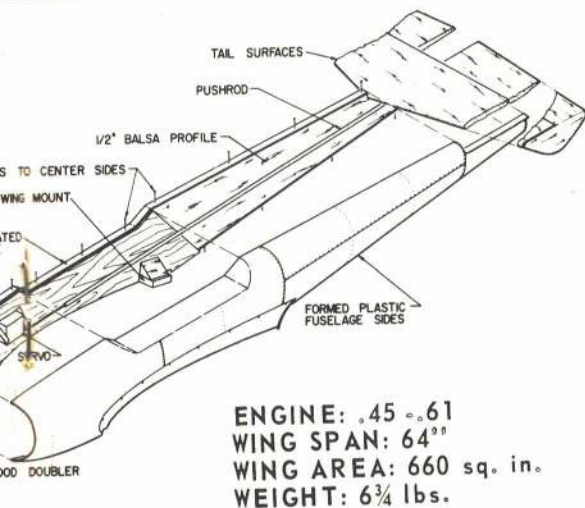


**KIT KBRC-1**  
**\$39<sup>95</sup>**

## PATTERN

## Ship

## cale



ENGINE: .45 - .61  
WING SPAN: 64"  
WING AREA: 660 sq. in.  
WEIGHT: 6 3/4 lbs.

# THE ULTIMATE IN CONTROL LINE STUNT SUPER CHIPMUNK

DESIGNED BY MIKE STOTT



**ENGINE: .29-.40**  
**WING SPAN: 53 1/2"**

- New Look Molded Plastic Cowling
- Sleek Bubble Canopy With Molded Framing
- Smooth Formed Plastic Wheel Pants
- Handy Printed Sides - Build Directly On The Wood
- Heavy Duty Bellcrank
- Colorful Decal Sheet
- Formed Torsion Bar Landing Gear
- Complete Hardware Pack Including Molded Nylon Hinges
- Die Cut SIG Balsa And Plywood
- Detailed Full-Size Plans

**SIG**  
**KIT CL-19**  
**\$14.95**

THE LATEST VERSION OF THE FAMOUS AEROBATIC AIRPLANE FOLLOWS THE LINES AND COLOR SCHEME OF THE MODIFIED FULL-SIZE CHIPMUNK FLOWN BY SKIP VOLK. THE UNIQUE LINES OF THE COWL AND CANOPY SETS THE MODEL APART FROM THE AVERAGE STUNTER. DESIGNER MIKE STOTT HAS INCORPORATED EASY CONSTRUCTION WITH STRENGTH AND DURABILITY TO PRODUCE A HIGH PERFORMANCE BEAUTY



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OUR GIANT 1973 FALL CATALOG is now ready! Completely revised, it illustrates thousands of model airplanes, hardware, paints and many other items used in the building and flying of model airplanes. Over 248 pages features the famous Sig Line, plus practically all other lines available. Included are radio-controlled models, gliders, sailplanes, Rubber-powered sport, scale, control line stunt, beginner's projects, plus every other conceivable type of model. For sale at your local hobby shop, or send \$1.00 today for your copy. You will agree it's a dollar well spent!

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**SIG MANUFACTURING CO., INC**  
401 S. FRONT STREET  
MONTEZUMA, IOWA 50171

**Additional Scale Comparisons for Selection:**  
**Commercial-Private Planes:** Here we have the whole range of selection from good to bad. While the Piper Cub will be relatively easy to build and fly, some of the multi-engine planes can present many of the construction and weight problems encountered in the World War II fighters and bombers. The degree of difficulty in obtaining scale data, and the number of operational features that might be employed also varies greatly. One advantage in choosing this type plane, however, is that the real thing is easy to find at almost any local airport. This presents a great opportunity for getting all the photos you may need for detail work if the written material is not available.

**Jets and Homebuilts:** These two types of planes are at opposite ends of the scale in almost every respect. With jets, construction is difficult, they don't fly well and data may be hard to obtain. Homebuilts, on the other hand, are adaptable to almost any scale size, fly well, are fairly easy to construct, and scale data is easy to find. This suggests that the homebuilt might be the near perfect subject. Only one problem: Who gets overly excited about a homebuilt?

To sum up, I guess we can say that there is no way of really selecting the perfect subject. Each type has its strong and weak points. Therefore you must make your selection very carefully. You should base your choice on your own building capabilities and what you expect of the model.

**Sport Scale vs. Flying Scale:** Sport Scale, Dirty Scale, Stand-Off Scale, etc. all mean the same thing—Scale events that do not require the effort and sophistication that go into producing a model for the regular AMA Flying Scale events.

In Sport Scale the model need only simulate. Measurements of the model are not taken. A minimum of data to prove what plane is being displayed is necessary; judges do not pour over reams of presentation material. There are no arguments about whether this or that rivet is in the right place. Judging usually takes place from the edge of a 20 ft. dia. circle with the model in the center. The circle permits the judge to view the model from all sides at a prescribed distance.

This type of event has been used with a great deal of success by RC modelers for the past two years. A review of the 1973 contest calendar shows its widespread popularity. This was possible for two reasons: the modelers' demand for scale-like flying models, and a great effort among manufacturers in the production of near-scale kits.

What about Sport Scale for Control Line? It would seem that if Sport Scale brought scale modeling back to RC, it should be able to do the same for CL. A review of the mid-May 1973 AMA Competition Newsletter shows that two proposals for establishing a CL Sport Scale event are under consideration by the Scale Contest Board. One of these proposals, or perhaps a modification of the proposals, may bring a set of Sport Scale rules to CL fliers by 1974.

It is my opinion that if a Sport Scale event is to be successful in CL, as it has been in RC, the rules must be kept at least as simple as the rules for the RC event. The rules should make it easy for the contestants as well as for the judges and sponsors. After all, the name of the game is Sport.

Why does Sport Scale need a long list of rules, options, and formulas for determining the scoring of flights? It seems that the proposed Sport Scale rules would do to Sport

**Comanche by George Gaydos** has seen plenty of action in the regular AMA Flying Scale event at many local contests in the East. Would we turn such a plane away from a Sport Scale event?



**Sport or Regular Scale Event?** T-34 by S. Abdow and Chipmunk by G. Simpson could be entered in a Sport Scale event as well as the regular AMA Flying Scale event.

Scale what our present rules have done to the regular Flying Scale events. That is, we've become so bogged down with rules that many modelers have said, "Why bother?"

I'll no doubt be accused of living in the past for this next statement, but here goes. I can still remember the days when 25 or 30 models could be seen at Scale events in local contests; all we had to do was fly ten level laps to have the plane qualify. Then we began to add all sorts of options and maneuvers to the rules (because of a few squawks) to permit all types of models to compete on an equal basis. Today we see neither the "other" type planes, nor the maneuvers being performed. We're lucky if we see more than 10 or 15 models at a local contest that has a Scale event! Perhaps this will all change with the introduction of a Sport Scale event.

I hope that Sport Scale for CL will be an event that promotes participation. This would be an event as simple as possible in terms of scoring, operation, and administration. The event should be one that will permit Juniors the greatest opportunity for participation.

An event that is Sport promotes the fun aspects of modeling, puts on a show, and gets the fliers out with their planes. If a modeler wants all the complications and frustrations of rule interpretations, lead him to the Flying Scale events.

## CLAUDE McCULLOUGH ON RC

**Kovering Kink:** When modeling the typical, steel, tube fabric-covered lightplane fuselage, conventional construction can cause problems. Dope may run through the fabric and puddle against upright structural pieces. As it dries, this part of the fuselage is pulled down into a wrinkled and unsightly scab. The drawings show how to avoid this with an addition to the usual square balsa or sheet side main frame. The results are better scale appearance more comparable to the tubing structure of the prototype plus an increase in strength.

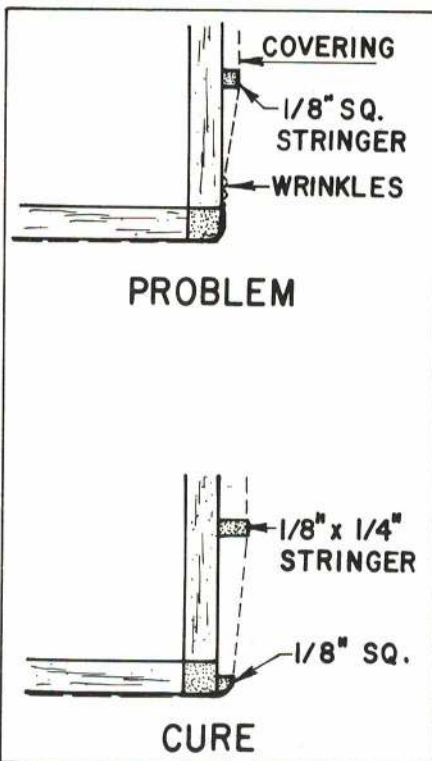
**Warp It Back:** Fabric-covered structures are also prone to warping after covering and doping. To avoid this, use only hard balsa wood for stringers, leading and trailing edges, in the corners of fuselages, and in tail outline pieces.

When scale requirements dictate a small size for accurate duplication, switch to spruce. Use low shrink dope and keep the number of coats to a minimum.

Sometimes, in spite of every precaution, a wing or tail will twist out of line. The old steaming tea kettle method may work on a tissue-covered rubber job, but not on a color-doped RC wing. Here is the only corrective measure I have found successful so far: Spray on a thin coat of clear dope. Allow it to dry only until handling without fingerprinting is possible. Block and weight down on a flat surface into an equal twist in the opposite direction from the original warp. For example, if the wing is warped down 1/4" at the tip, prop it up so that it is forced into 1/4" up warp at the same spot.

At this point, the partially dry covering is stretchy. To introduce the new warp, twist it in your hands before weighting it down. Set aside for 24 hours.

When you release the twist, the new opposite warp will remain. However, the dope is not yet completely cured and internal stresses sustain the first warp. Consequently, it will start to twist back in the original direction. How far it will go back is strictly arbitrary, but hopefully it will end up zero-zero. If not, a further adjustment is necessary. Use the results of the first attempt as a guide. Allow at least a week for curing time.



Caution: Use plastic to keep the wing from sticking to the flat surface or to the blocks used for twisting. Do not use wax paper; it will pollute the doped covering and keep it from drying properly.

**Double Cross:** The spreader tubes used at the intersection of the flying and landing brace wires between the wings of many scale biplanes are hard to install with proper alignment. The usual method of drilling holes through a dowel and stringing it on the wires usually results in pulling one or more of the wires out of place. Dick Graham installs the wires on the assembled model first. The dowel is then fitted into each wire at the intersection one at a time. To accomplish this, saw a slot halfway through the dowel, insert the wire and fill the slot with epoxy.

## BILL HANNAN ON FF

**BH Substitutes While WM "Seeks Thrills":** Walt Mooney is attending a Full-size Sailplane meet and has asked me to fill in for him this month. Perhaps some of you may be unaware that Walt is as well-known in full-scale aviation circles as he is in modeling. He recently performed his glider aerobatic routine for the TV series "Thrill Seekers." If you missed the program, be certain to watch it during the reruns!

**ROW Scale:** On Sunday, June 10th, the Rockwell International Flightmasters all-scale club hosted another contest at Lake Elsinore. Classes included Rubber, CO-2, Gas, Free Flight and RC. The weather was beautiful, the attendance good, and the variety of entries remarkable. Interestingly, several models which had performed well in the previous ROW meet failed to leave the water, including Bill Pardoe's and yours truly's!

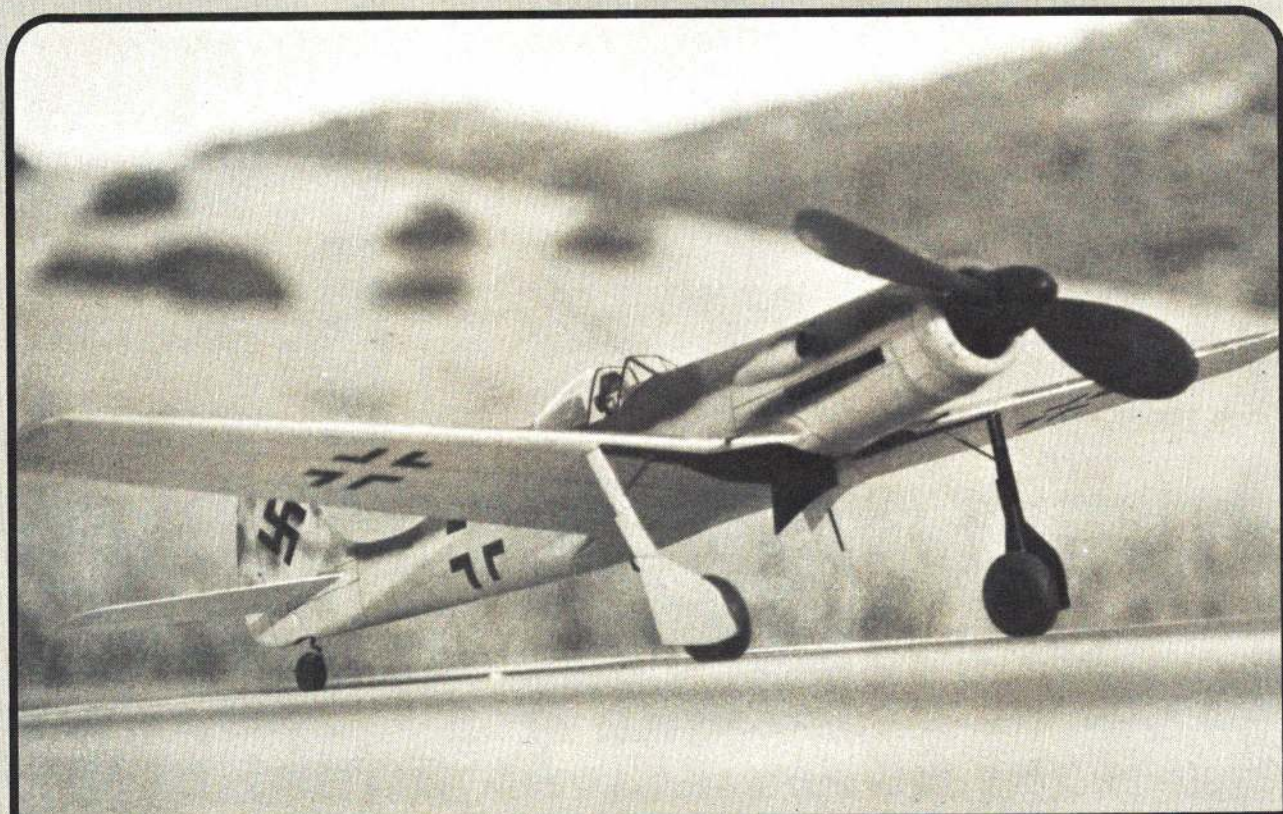
Dornier designs of several vintages were on hand. This suggests that flying boats with

(Continued on page 108)

**Bill Hannan's half-in.-to-the-ft. F6F** is an excellent flyer. Good scale dihedral helps.



# Focke-Wulf TA-152



About the only deviation from scale is the enlarged prop and the stabilizer.  
Even the modified Trexler wheels are unique.

# Focke-Wulf TA-152

For the past three years I have entered the Annual Flightmasters Jumbo Rubber Scale event. The first two years I won the meet with a semiscale Puss Moth. The plane was successful, but did not entirely fit into the spirit of the contest—it flew too well! The third year I decided to build to the other extreme. Though it did not win, it proved that this type of plane can be built and flown successfully.

The Focke-Wulf TA 152 H-O was chosen because of its good proportions. The construction technique was developed to produce a strong, light, simulated metal finish without the problems of planking a typical former and stringer structure. Its strength can best be illustrated by the pictures of the finished plane taken after it had been flown approximately 35 times and escaped two tangles with parked cars!

Construction methods will be stressed in this article, so if you have a pet plane you would like to build, all you need is a good three-view and you can build it in the same manner as the Focke-Wulf. This plane will also make an excellent 1/2A Gas Scale model with very little modification.

The plane has several unusual features: removeable motor tube with return gears (which keeps the rubber well forward and helps balance the plane); Trexler air wheels with modified hubs; sliding canopy; fiberglass cowl and spinner; the planked polystyrene foam fuselage and wing (the basis for the whole plane); and the pilot, complete with his custom-made leather flying helmet and coat.

Those who feel the project is a bit ambitious will be pleased to note that this is the first time I have ever hot wire-cut foam, planked foam or used return gears. So don't be discouraged, just roll up your sleeves and start!

## Construction

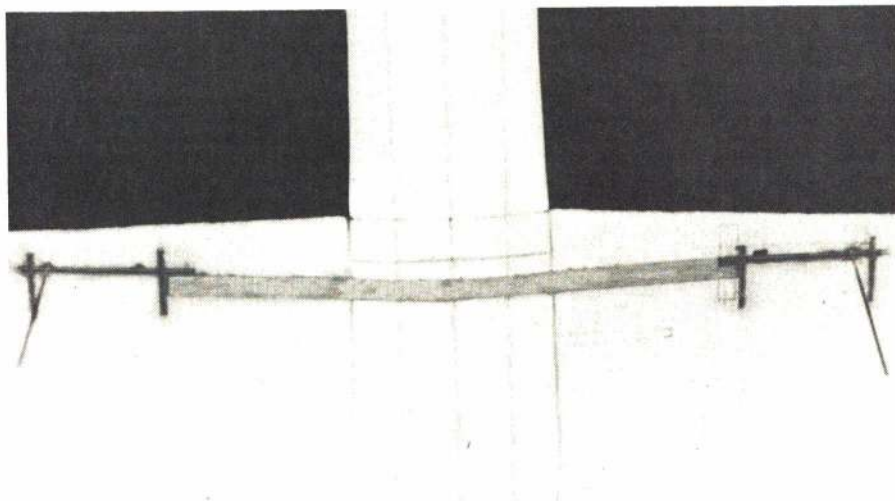
**Fuselage:** Obtain two in. thick polystyrene one lb. per cu. ft. bead board. (I found it at the local builders' supply.) Place two layers together and push an 1/8" dowel in through the tail and nose to keep the halves together while you carve. Trace the top view and side view on the block. Cut to shape on a band saw or with a hacksaw blade. Make cardboard templates for the various fuselage station cross sections. Carve to rough shape using a sharp X-acto carving blade or similar knife. Make sawing motions with the knife in order to keep from tearing up the foam. As you carve, use the X section templates as a guide. When you get near the proper X section, use very coarse sandpaper and file off the excess material. 320 grit sandpaper will give a smooth final finish.

When the outer surface is finished, pull out the dowels and separate the

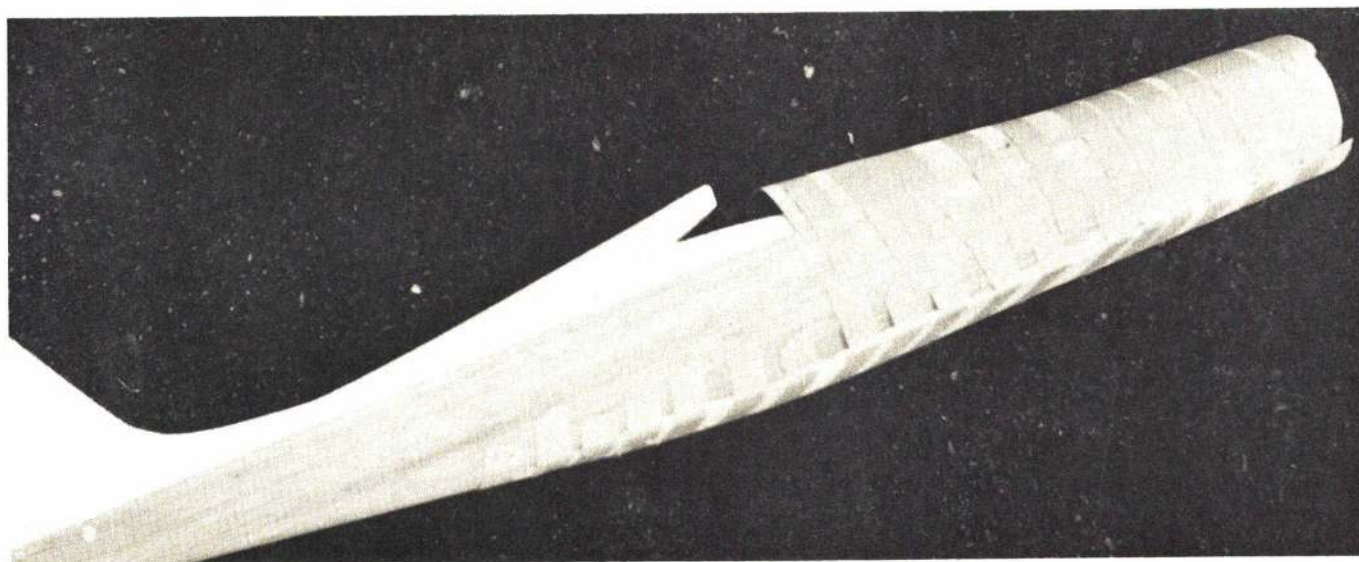


Above: Glide is quite good, a strong thermal will take it up, prop free-wheels during the glide. An OOS flight is not likely though. Right: Turnaround gears in the motor tube are made from stock Boston gear parts, ball bearings used throughout. With gears, a short motor can be used without sacrificing rubber length. CG also helped. Below: In front, the winding plug and the prop assembly. Wind up the motor, then install the whole thing in the plane for a flight. This saves the plane if the motor should blow.





Above: Wing and fuselage fitted prior to sheeting. Lines on fuselage are from laminations of foam which help in carving the sides for smooth and equal shape. Left: Wing has one dihedral spar. Landing gear is a torsion action system with side brace. Note that its stresses are distributed fore-and-aft in the wing and to the dihedral brace. Below: 1/32 soft light balsa skins are made by soaking in water and ammonia solution, then taping to foam form until dry. They are then bonded to the foam.



# Focke-Wulf TA-152

fuselage halves. Hollow out the fuselage with a hot wire. I did it in the following manner: Form a half loop of wire about three in. in diameter out of .032 wire; hook up to a Variac and set at a position just hot enough to melt the foam (5-10 on a full-scale 140). Now with the hot wire just scoop out the foam until you have about 1/4" wall left. The TA 152 foam fuselage weighed 1.35 oz. when finished. Other methods for heating wire could employ a DC power supply, automobile battery or an auto battery charger.

With the foam fuselage all hollowed out and the outer surface finished, glue the two halves together using Titebond or a water-base rubber cement. (Do not use any solvent-base cements or your foam will disappear rapidly!)

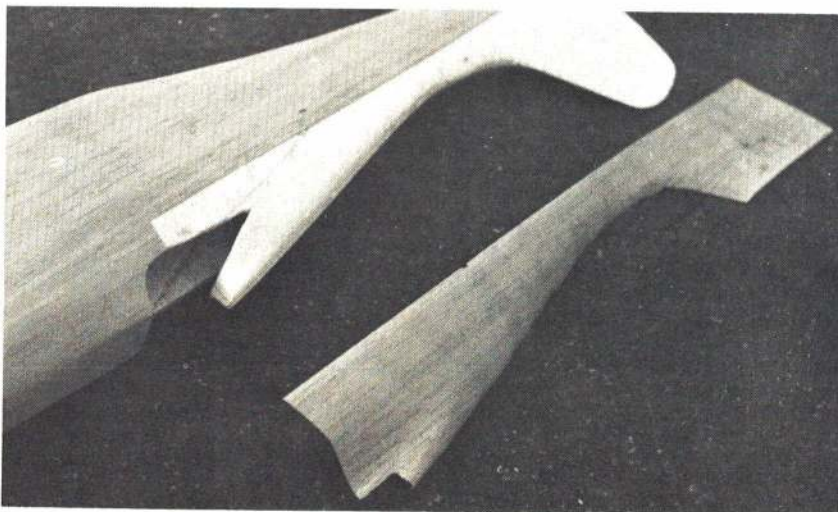
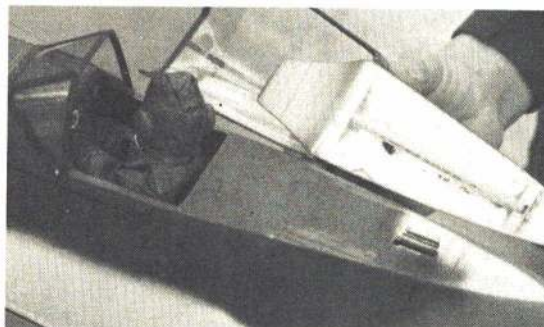
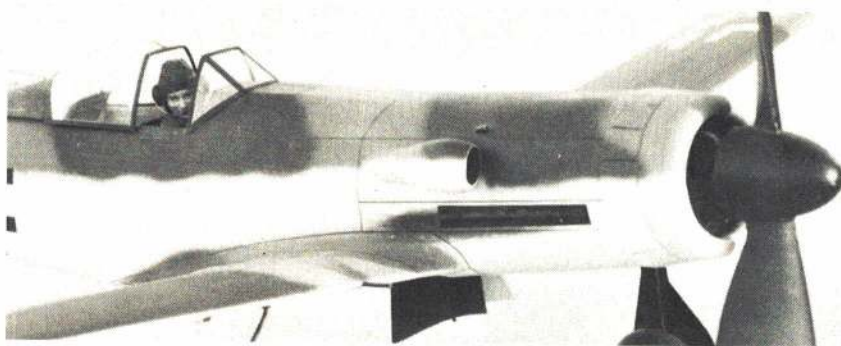
Planking is the next step. Select light, straight grain 1/32 balsa three in. wide. Soak the wood in a water-ammonia mixture approximately 1-5% for about 15 min. The wood will appear to darken up as it wets; remove and rinse thoroughly. Place the three in. wide strip on the side of the fuselage with the bottom edge slightly below the wing rib base. Trim off the excess wood and, using one in. wide masking tape, secure the wood in place with a gentle but firm pull. Don't be afraid to use lots of tape—about every two in. You will be surprised how much the wood can be formed.

Allow to dry for several hours. Heat may be used to speed up the drying process, but don't go to more than about 120°F or the foam may melt or distort. When dry, remove the tape carefully to avoid tearing the wood. Trim off excess wood on the top and bottom of the rear end. Remove the formed sheet from the foam fuselage; then form the other side in a similar manner. Before trimming off excess wood, place the first half on the form and line up the area to be trimmed to match in areas where the two sheets overlap. Next, glue one side on at a time. Spread on even but thin film of Titebond on all wood surfaces. Place on the form (foam), position carefully and tape in place using masking tape. When dry, remove tape and bond on the second side after making sure it matches all joints with the first half.

The top and bottom planking on the nose are done in a similar manner using sheets four to five in. wide. Splice this sheet by placing the seam down the center of the top and bottom. Be careful when water soaking—excessive soaking can cause the seam to come apart.

After these two pieces are formed, carefully trim to fit and bond in place. The turtle deck and rudder can be formed next. Soak the sheet as before, overlap the side sheeting slightly and trim to approximate shape. Using mask-

(Continued on page 87)



Above: Careful air-brush painting and detail marking give the shape its military look. It makes really beautiful takeoffs. Left: Would you believe the pilot has a custom-made leather flying helmet and jacket! Rear canopy section is removeable and slides aft on rails. Below: Partial assembly of the fuselage. Top right rear decking about to be attached. Author used Titebond throughout, moisture escapes easily through the thin balsa.

## Data Sheet on TA-152 H-O No. 150005

Scale: 1.02" = 1'  
Full-size plane: 47' 6 1/2" = 48"

### Sources

#### Photographs:

1. William Green, *War Planes of the Third Reich* (New York, Doubleday & Co.), pp. 236-7. Library of Congress No. 88-29673.
2. *Focke-Wulf 190 & TA 152 Series 1, No. 9 Technical Manual* (Australia, Kookaburra Technical Publications), pp. 27-29. (North American Distributor: J.W.C. Publications, Sun Valley, Calif.)
3. *Profile No. 94 Focke-Wulf FW 190/TA 152 Series* (Windsor, Berkshire, England, Profile Publications Ltd.), pp. 9-12.

#### Three-Views:

*Op. Cit.*, Green, *War Planes of the Third Reich*, pp. 235 and 237.  
*Op. Cit.*, *Focke-Wulf 190 & TA 152*, centerfold. (Note: These three-views are

inaccurate and should only be used for general fuselage cross section.)

#### Color Scheme:

*Op. Cit.*, *Focke-Wulf FW 190 & TA 152*, p. 27. (I also based my color choice on several comments that the two-tone brown was prevalent on these planes at the end of the war.) Approximate colors are shown in *Focke-Wulf FW 190 & TA 152*, p. 24.

#### Fidelity to Scale:

All items (dihedral, rudder area, landing gear length, etc.) are scale; only the stabilizer and prop are modified in size.

#### Construction:

The wing and fuselage are carved out of polystyrene closed cell bead board, then planked with 1/32 sheet; the stabilizer is 3/32 sheet. These materials were used to best simulate the surface of the full-size aircraft. The construction required no ribs, formers, spars or stringers.



## SPECIAL THANKS

The beautiful Citabria is manufactured by one of the oldest and respected names in American Aviation, The Bellanca Corporation, who so graciously provided us with the plans, photos and details of the full size aircraft. With this illustrious lineage, it is not surprising that the Citabria is just about unbeatable as a fun plane. Primary trainer, or for Aerobatics.

## CITABRIA IS FOR YOU

If you're a Sport Flier, if you have a feeling for Scale, if you love R/C\*, then this is your ship. It's a beautiful machine that builds easy—goes together fast—plenty of room for any equipment—rugged for hard use—flies great—and is just about the right size.

### ABOUT THE KIT ITSELF

This kit is a real joy . . . Balsa Wood is the finest grade, density-selected and sanded to micrometer tolerance; as is the imported Finland Birch Plywood. Every part is numbered to insure fast and accurate assembly as shown on the easy step-by-step plans.

\* Can be flown Control Line too—instructions on plan.

### THE FUSELAGE

Fuselage sides are die cut full length. Cabin sides and inner doublers are plywood as are the firewall and landing gear bulkheads. It's easily assembled with die cut balsa bulkheads, nose block, formed music wire landing gear, custom dural engine mounts, etc. Cowling and wheel pants are rugged plastic.

### WING AND TAIL SURFACES

Complete wing is built on work bench without having to remove it—so it's flat and warp-free. Parts are die cut and carved. Balsa sheet cover makes for tough wing. Wing is installed like it ought to be—with dowel pins and nylon screw in wood nut-block. No unsightly rubber bands to deteriorate.

break or slip. Rudder and Stab are die cut sheet for simplicity and no warp. Included is all the linkage hardware: pushrods, aileron and elevator horns, bellcranks, clevis, connectors, etc., plus giant authentic decals, plastic windows, etc., etc.

# CITABRIA



Span 54" Area 415 sq. in. Length 36" For Engines .23 to .35 Scale: 1.61" Equals 12.0"

KIT PS31  
29.95

beautiful

*Cirrus*



over seven feet of sheer grace and beauty . . .

## STRUCTURE

Frame Photo reveals the excellence of the design engineering of the kit. Although structure is relatively simple, it is one of fine detail and great strength.



SPAN: 87 $\frac{1}{16}$ "  
LENGTH: 37 $\frac{3}{4}$ "  
WEIGHT: 12 oz.  
SCALE: 1.5" Equals 12.0"

KIT E7  
11.95

## GREAT FLIGHT PERFORMANCE

A real soaring machine is this model Cirrus. Eiffel 400 soaring wing section seeks out and takes full advantage of every thermal current. Can be flown Tow Line - Free Flight, Single Channel or pulse R/C for Slope and Thermal Soaring. Large Cockpit area provides ample room for R/C Equipment.

## A FINE KIT

Top quality Balsa used throughout. All parts accurately die cut and numbered to insure fast accurate assembly, as shown on the detailed plan. Also included are shaped trailing edges, finished nose cone, giant clear canopy, authentic decals, full size plans with step-by-step drawings and instructions, etc.

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If no dealer available, direct orders accepted—with 10% additional charge for handling and shipping. (60c minimum in U.S., \$1.25 minimum outside U.S.)  
☐ Catalog of entire line of airplane control line model kits, R/C scale and Trainer kits, boat model kits, accessories, etc. 25c enclosed.  
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# *The Great Age of Sail . . . Lives Again* *in these Authentic Scale Model Kits*

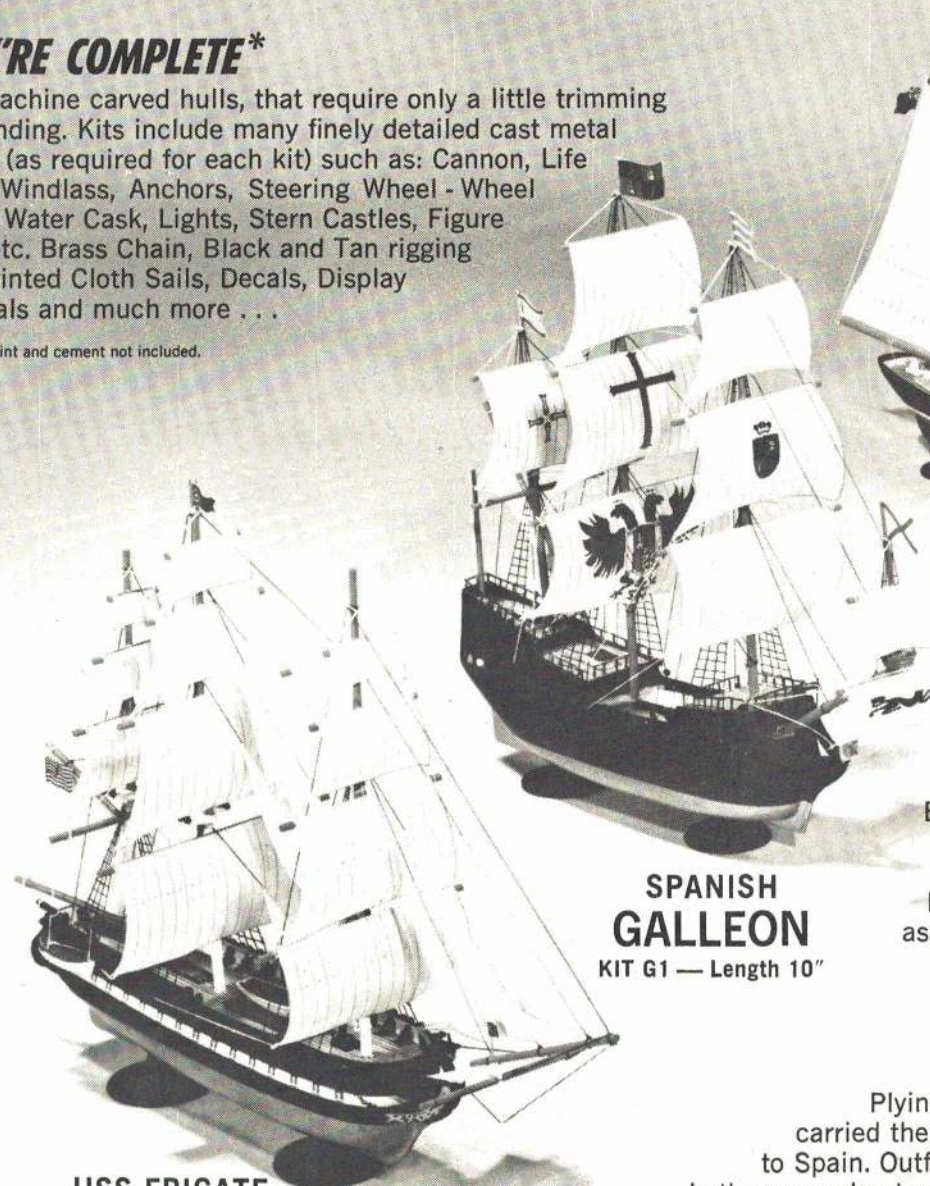
## **THEY'RE EASY TO BUILD**

We know it seems unbelievable, but it's true. New techniques in the heretofore difficult rigging installation and ratline making, are simplified so that almost anyone can produce a craftsman-like job. Density selected prime balsa wood is a real pleasure to work with, and the step-by-step plan is simple and complete.

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With machine carved hulls, that require only a little trimming and sanding. Kits include many finely detailed cast metal fittings (as required for each kit) such as: Cannon, Life Boats, Windlass, Anchors, Steering Wheel - Wheel House, Water Cask, Lights, Stern Castles, Figure head, etc. Brass Chain, Black and Tan rigging line, Printed Cloth Sails, Decals, Display Pedestals and much more . . .

\* Dry Kit, paint and cement not included.



**USS FRIGATE  
CONSTITUTION**

KIT G2 — Length 11"

**SPANISH  
GALLEON**

KIT G1 — Length 10"

**SCHOONER  
BLUE NOSE**

KIT G3 — Length 11 1/4"

## **THEY'RE UNIQUE**

Because such amazing detail and authenticity is achieved in kits that are relatively easy to build. Plans include full size, as well as assembly drawings for each step of the way. Authentic color scheme shows on full color kit box lid.

## **THEY'RE HISTORIC**

Plying the Spanish Main, the Galleons carried the treasures of the New World back to Spain. Outfitted with cannon they were used both as merchant men and warships . . . The Blazing Guns of the *Constitution* helped to establish our Nation. Now enshrined in Boston Harbor, it is the oldest commissioned vessel in the U.S. Navy . . . Built by Angus L. Walters the *Bluenose* was one of the finest Schooners to take the water. It came to world-wide fame racing against the *Gertrude L. Thebaud*. *Bluenose* captured the hearts of U.S. and Canada to such an extent, that today it is on the back of every Canadian Dime.

## **THEY'RE ONLY**

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ea.

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- CLOTH SAILS
- CAST METAL FITTINGS

**AND THEY'RE AT YOUR DEALERS NOW**

**GET OVER AND SEE THEM . . . BUY ALL THREE!**

# Detailing The S.E.5a

To look at this model you would think that a real S.E. 5a was just squeezed and shrunk, yet it is only a Stand-Off Scale model. / by Maynard Jubert

Author says that this is his first scale project! Apparently the more you play around with a scale model, the more details you find to make. The process can be endless. Look closely at the machine gun here.

Proper finish and detailing seem to make or break the overall appearance of the Top Flite S.E.5a. And like any other model, scale or otherwise, the finish depends to a great extent on the foundation.

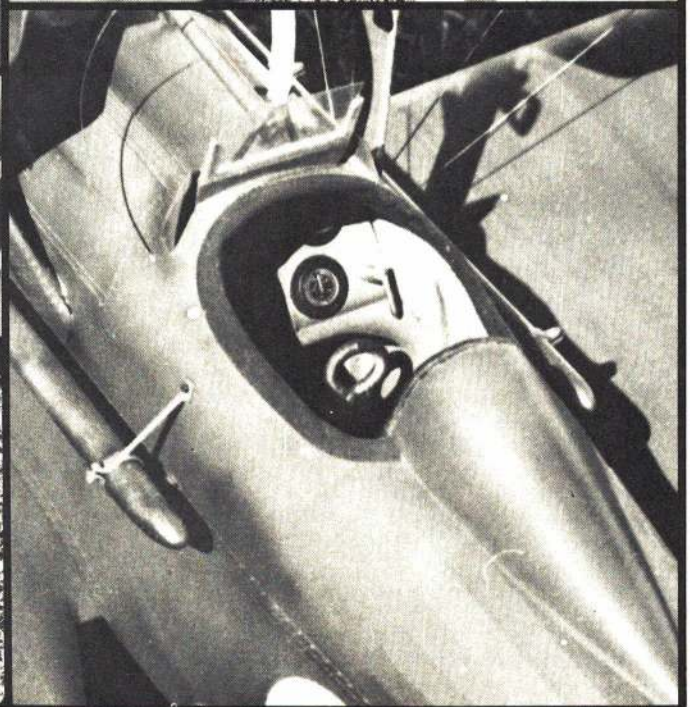
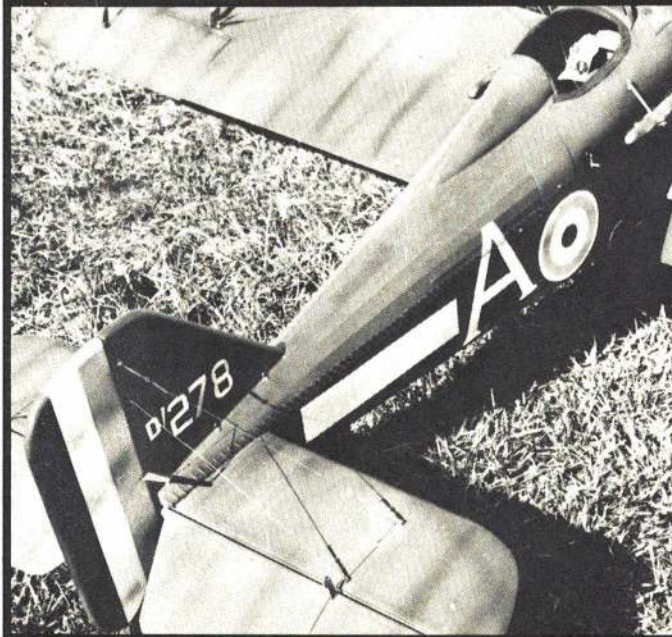
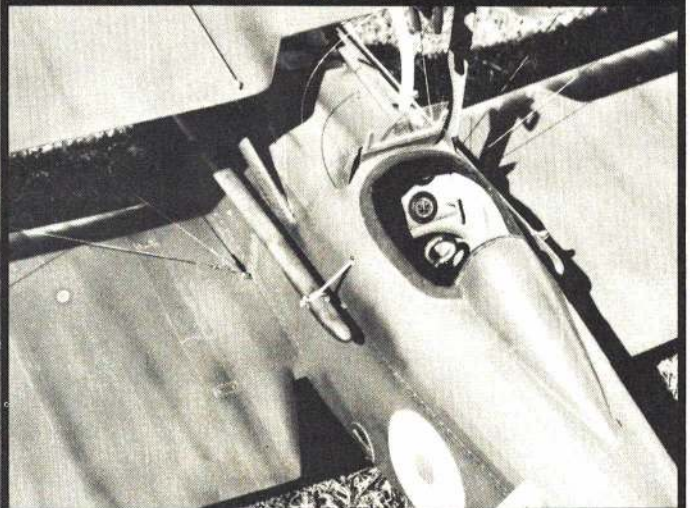
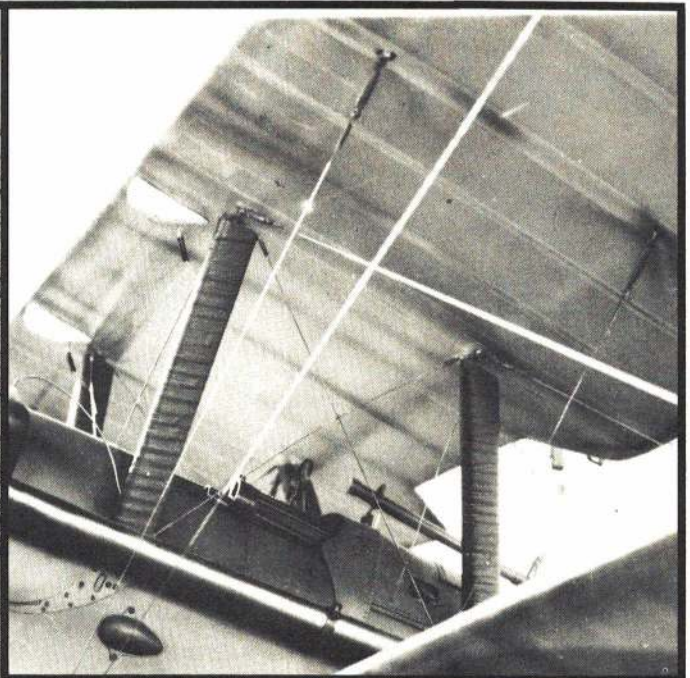
Choose materials that seem to work well for you and, when covering the S.E. 5, remember it has extremely thin, undercambered wings. Highly shrinkable fabrics will cause much grief unless you enjoy a challenge. I don't so I chose regular Coverite. It retains the fabric look, irons on easily, and requires very little dope. I highly recommend it for any similar surface.

After covering and clear doping, decide how much detail can be added before basic painting. Check scale views and photographs and proceed until the spring rains stop. An excellent reference book is Bourget's *S.E. 5a*, published by World War I Aero Publishers, Inc., West Roxbury, Massachusetts. The Top Flite S.E. 5 was based on drawings and cockpit photos from this book that leave no room for guesswork. Profile Publications and several other books were also used to complete my version which was a copy of Capt. E. Mannock of the 74th squadron.

One of the most useful materials in detailing is 3-M contact spray. Non-supporting details such as panels can be sprayed and put in place without the usual mess. It's excellent for gluing instrument dials or any other detail with

*(Continued on page 101)*





# DOUBLE DECK FLY BABY

"What this country needs is a good utility airplane!"

With that mundane declaration, the Experimental Aircraft Association launched its International Design Competition—back in 1957. They hoped to see the creation of a completely new airplane with folding wings which would be easy to fly, easy to build, safe and economical. A rather large order for a still young hobby.

By objective standards, the competition was not a success. The flyoff was to have been held during the 1958 EAA Fly-In, but not a single airplane was ready, so it was postponed for two years. In 1960, two airplanes made it to Rockford, Illinois for the judging, but neither had completed its test program, and the event was delayed for another two years. The one and a half year contest was stretching out for more than five years, and many people were wondering why.

Finally, in 1962, the competition was completed, though it was still far from a rousing success. Five airplanes appeared before judges to be considered on the basis of materials used, structure, aerodynamics, practicality, flying qualities. There was Tony Spezio's tandem, open cockpit Tuholer, Leon Tefft's Contestor, Gene Turner's T-40, Leonard Eaves' folding-wing conversion of the Cougar and Pete Bowers' thoroughly ordinary looking Fly Baby, named after a free-flight gas model he had built more than 20 years before.

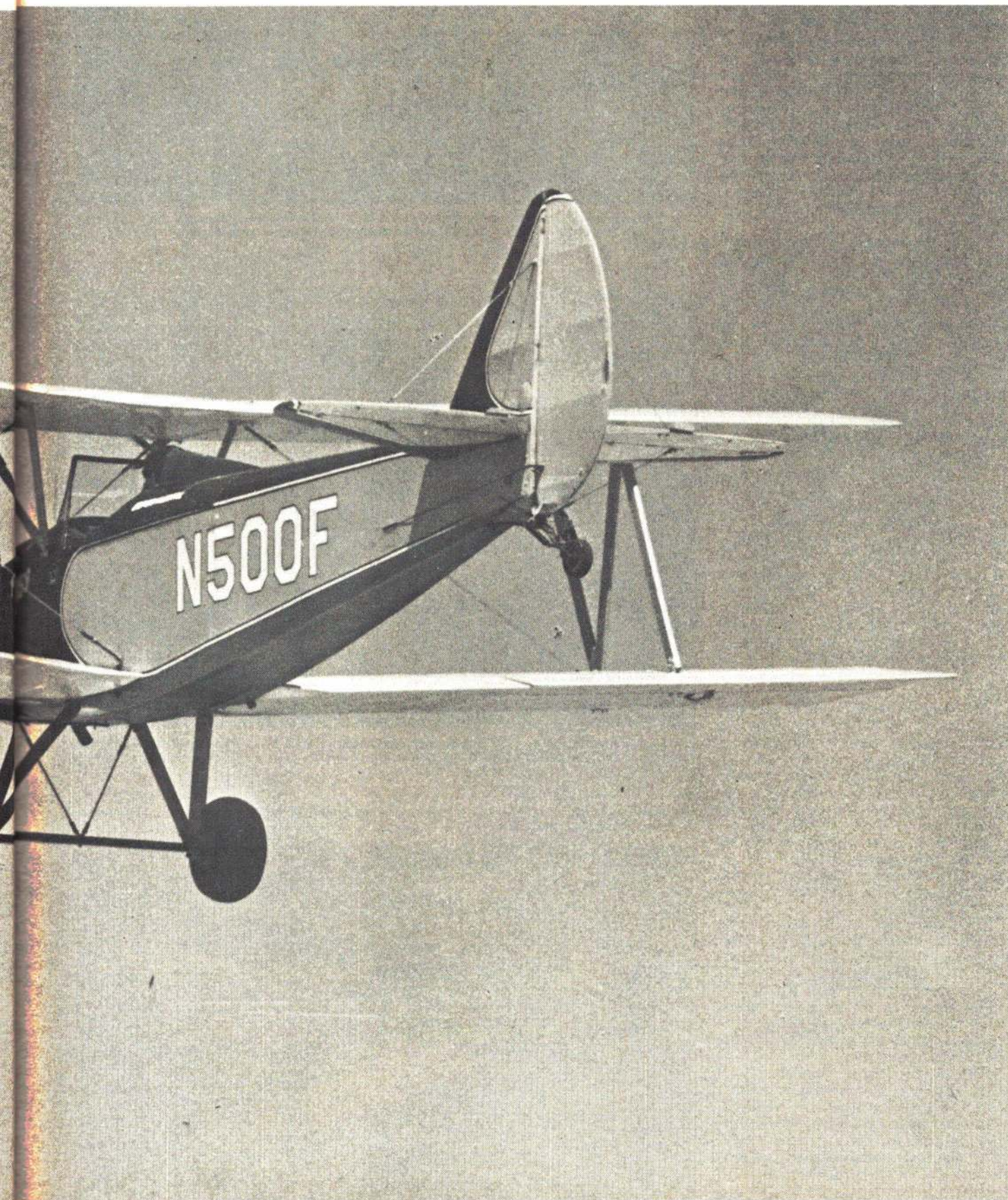
Not a single radical airplane was to be seen, nor was there a machine exhibiting the sort of truly original ideas which might revolutionize the building or flying of homebuilt airplanes. In fact, little separated the contestants' planes from the dozens of other craft on the field, aside from the special attention being paid them.

Anyone who had been hoping for some great breakthrough in light aircraft design or construction was mightily disappointed. If EAA and its novel movement were to have made great strides forward, it was not as a result of anything sitting on the field at Rockford, Illinois in August 1962. Or so it appeared at the time.

After the inspections had been completed, each owner timed as he folded and unfolded his airplane's wings, and the various craft test-flown by the judges, the points were totalled and the winner announced as Pete Bowers' Fly Baby. This airplane, on which EAA was counting for a large chunk of its future as a progressive organization, was a throwback to the earliest days of amateur airplane building! It was made mostly of wood, and had a rigid landing gear, open cockpit and wire-braced wings—similar to airplanes designed 30 or more years before.



Pete Bowers' popular homebuilt is a big model plane in all details. Perhaps that's because he used to be an active modeler. / by Don Berliner and Robert Parks



No one was more aware of this than Pete Bowers. "Well, the big design contest is over," he wrote at the time. "(It was) won by Fly Baby, that controversial clunk, that Box, that latter-day antique. Whether it goes on to join such classics of the homebuilt movement as the Corben, Baby Aces or the Stits Playboys, or slips quietly into oblivion, remains to be seen."

The lack of excitement was noticeable—most people had expected the winner to be truly new and different. Maybe nothing so far-out as an atomic-powered delta biplane, but at least an airplane incorporating some brilliant ideas which could be implemented by other designers. It didn't happen, for reasons which have subsequently become clear, but the long-term impact of the homely little single-seater has been considerable.

In the EAA's earliest days, the challenge had been a simple one—to fly! Anyone who could build and fly an airplane—any sort of airplane—had praise heaped upon him. EAA attracted builders more than designers or even innovators. To fly a homemade airplane had only recently been legalized, following the disastrous pre-WWII Flying Flea episode and the CAA's outlawing of the whole idea. Now, the hobby was beginning to grow, though its practitioners were still generally considered a bit eccentric.

The first homebuilts were anything but works of art, but any one which displayed above average workmanship was quickly smothered in trophies. This was the first area to see a major change. By the early 1960s, quality was shooting upward, and by the end of that decade it had become clear that social pressure and pride within the movement were pushing builders to totally unexpected levels of construction quality. The beautiful homebuilt was fast becoming the rule rather than the exception.

At the same time, there developed a trend toward performance. There had always been a faction interested in speed and efficiency (the Wittman Tailwind and the Midget Mustang were among the first popular designs), but more and more builders were seeing the performance value of slick finishes, neat fairings and other beauty-enhancing features. This increased interest in airplanes designed to go places in a hurry, like the Thorp T-18, Smyth Sidewinder and Mustang II.

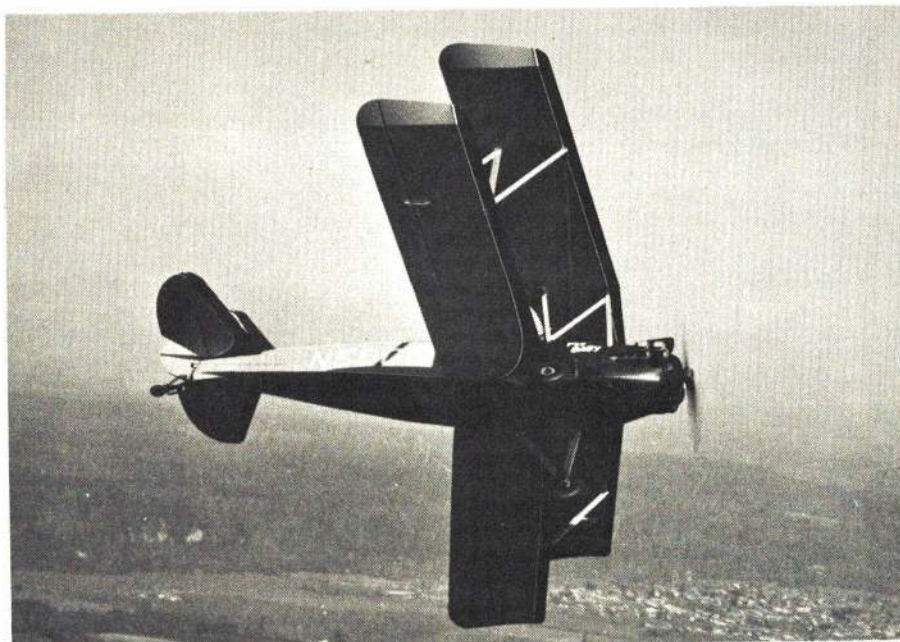
The hobby had by now grown to an unpredicted size—2500 airplanes flying, and twice that many under construction. The demand was for special-purpose planes like the Pitts Special and Cassutt Racer, for the occasional radical design like the Dyke Delta, and for the strictly-for-puttering-about type like Pete Bowers' Fly Baby.

Why the Fly Baby? There are several reasons: EAAers are builders, and Pete's pride and joy is a buildable little airplane. Also, many EAAers are low-time pilots, and the Fly Baby is as easy to fly as a Piper Cub, which is about all anyone can ask of an airplane. Moreover,

(Continued on page 108)



The Bi-Baby is identical to the Fly Baby except for a change of wings. To allow the pilot to get in and out, it was necessary to put the center section of the upper wing ahead of the cockpit as shown.



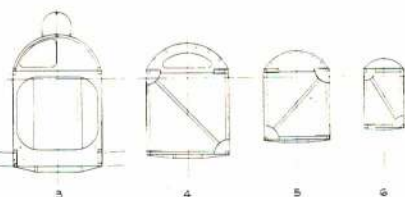
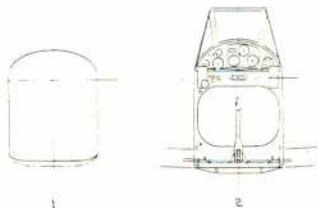
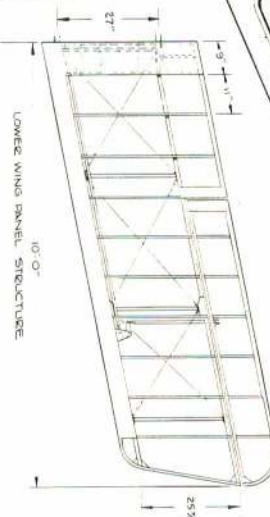
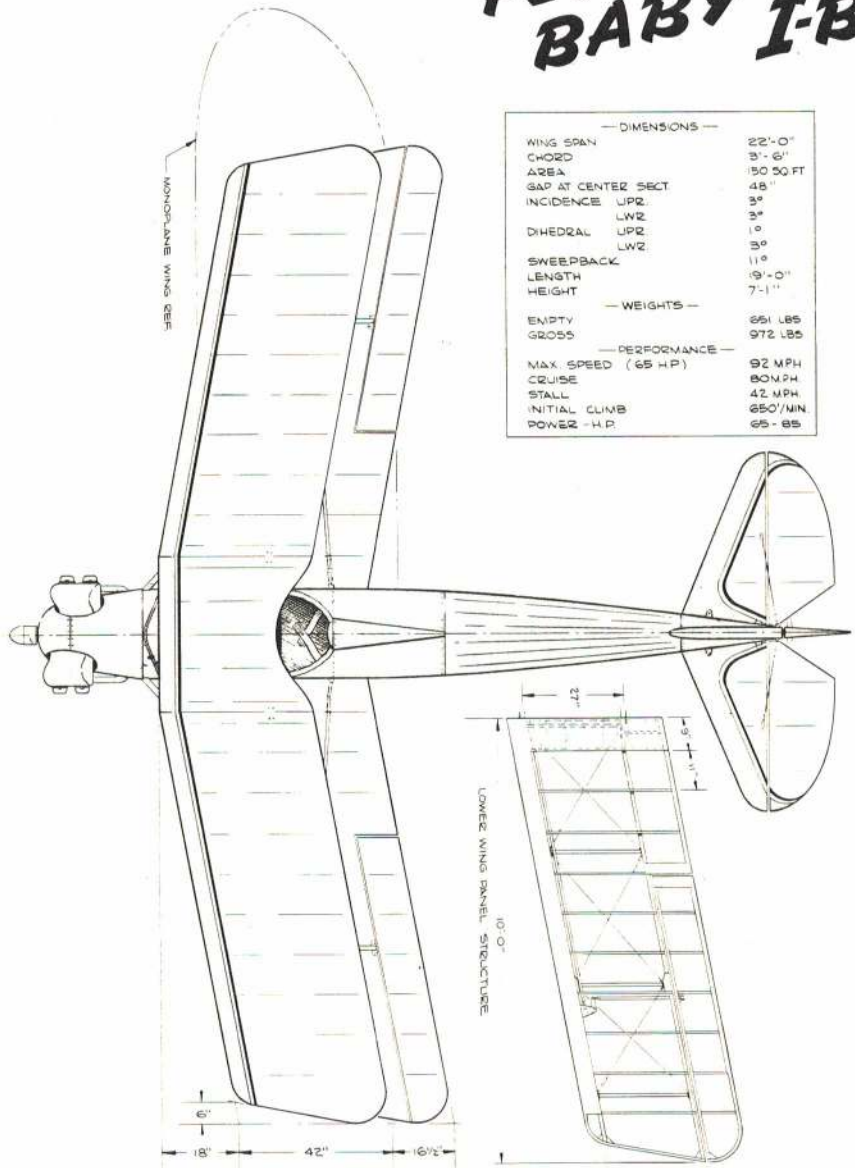
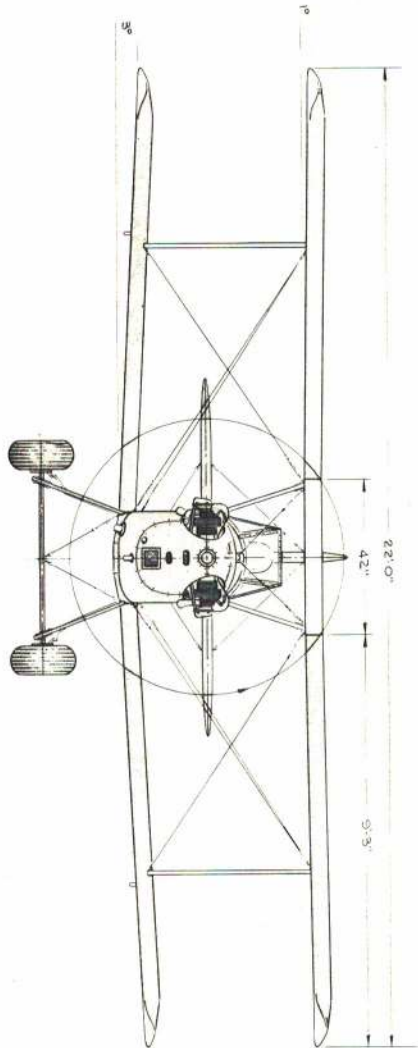
Long tail moment arm combined with 11° sweepback of both wings gives the Bi-Baby a strong resemblance to the British deHavilland "Tiger Moth" and the German Bucker "Jungmeister."

The monoplane Fly Baby features a straight low wing. With the pilot seated right on the center of gravity, the balance of the airplane is not upset by variations in pilot weight.



# FLY BABY I-B

— DIMENSIONS —	
WING SPAN	22'-0"
CHORD	3'-6"
AREA	150 SQ FT
SAD AT CENTER SECT	48°
INCIDENCE UP2	3°
DHEDRAL UP2	3°
DHEDRAL LW2	10°
SWEEPBACK	3°
LENGTH	19'-0"
HEIGHT	7'-1"
— WEIGHTS —	
EMPTY	651 LBS
GROSS	972 LBS
— PERFORMANCE —	
MAX. SPEED (65 H.P.)	92 MPH
CRUISE	80 MPH
STALL	42 MPH
INITIAL CLIMB	650'/MIN.
POWER - H.P.	65 - 85



FUSELAGE STATIONS - REAR VIEWS



## JOHN BLUM ON CL CARRIER

**Bending the Pushrod:** Since many fliers enjoy the security of the Z or S bend in the pushrod, it is worth discussion. Many modelers cannot make a good solder joint and, consequently, prefer a substitute method of assembling pushrods and linkage.

There are a number of dependable types of keepers on the market; for pushrods with larger diameters, commercial keepers and/or solder joints are necessary.

Carrier models being smaller, however, are excellent subjects for 1/16" to 5/64" dia. pushrods. The S bend can be made effectively in those with simple standard pliers.

First, make a 90° angle bend at the end of the pushrod about 3/16" long. Then grip the ends of the bent portion with the jaws of the pliers. Use the portion of the plier jaws that form a cylindrical opening. At this point, the jaws of the pliers are gripping the wire bend and the pushrod is perpendicular to the pliers. With the wire bend at approximately 1/16" from the edge of the plier opening, grip firmly and bend the wire again to form a perfect S bend of two 90° angles. Pay attention to direction of bending or a U shape will be formed instead of an S. With a little practice it will work every time.

**About Those Flaps:** Recent trends in Profile Carrier installation are toward full-span aileron action; or, inboard flap down, outboard flap up. There is no dispute on the effectiveness of this development. Variations have been used for years. Yet, where do we draw the proverbial line between the types to use? It is not the intent here to criticize their use but to measure practicality by comparison.

**Blackburn Firebrand** by Andrew Keiller of Victoria, Australia, features HP 40RR power, solid wing, and planked fuselage. Fairey Spearfish is in background.

Don Gerber's Mo-Bipe design illustrates efficient use. The application is efficient and effective since the subject is a biplane—short span and narrow chord. Consequently, narrow ailerons produce effective line tension and a workable and flyable amount of "roll" in the model at slow speed.

Placing full-span, wide ailerons on a Profile model of any span, however, can have "non-habit-forming" results. For example, one entry at a recent meet had a Profile Carrier model of approximately 325 sq. in. of wing area. The ailerons comprised about 12 to 13% of the total area, and a movement of about 30°. During the slow speed phase, the model rolled so much that the outboard wing tip touched the deck before the gears. During the second flight, the wind had increased and the model's outboard tip rolled under completely during the slow speed phase of the flight, coming to an inverted rest.

All things considered, the practical approach might show maximum aileron area at

**Class II Guardian launch at contest in Eisenhower Park, East Meadow, New York. Note model attitude indicating short takeoff.**



about 5% of the total wing area. Longer span means a longer flap; to maintain 5% area would mean a very narrow flap. In addition, the full-span on the larger span means more "roll" movement due to moment arm length. Conclusion? Full-span ailerons on short spans and partial ailerons on larger spans. Send info, ideas, and pics on Navy Carrier to John Blum, 2417 Glen Pl., Granite City, Ill. 62040.

**More Proposals:** This column usually remains impartial, but this is an exception. If adopted, certain proposals in action will alter the Profile Carrier event to a restrictive activity. It will be almost to the point of dictating what the modeler will use and the way he will design and build. Modelers should be aware of this proposal and voice their opinions or Profile Carrier may lose all the beneficial aspects it now offers.

## BOB STALICK ON FF GLIDERS, POWER, RUBBER, INDOOR

**What You Wouldn't Know If You Didn't Read Newsletters Dept.:** Dick Castle and Bob Beecroft note two items of interest to all FFers in The San Diego Orbiters' newsletter, "El Torbellino."

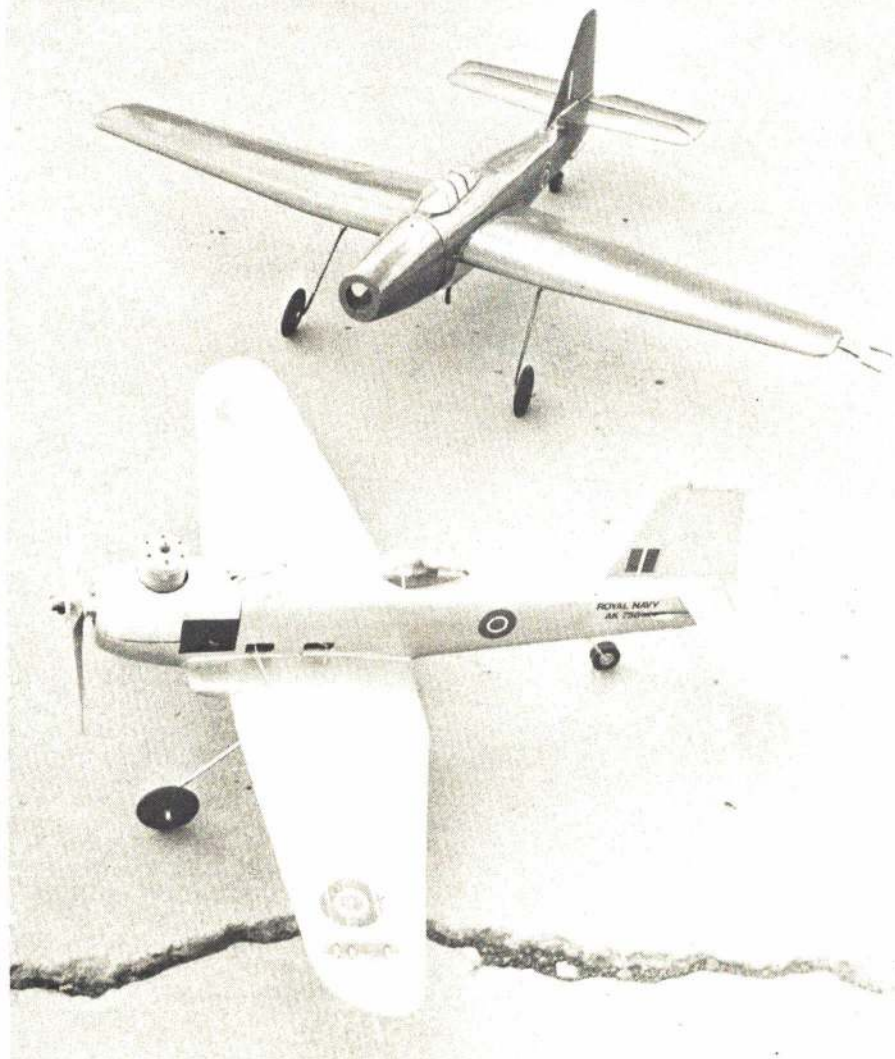
Castle writes: "I picked up a new Cox the other day. Clean 'em out before you run 'em. I was really surprised at the amount of junk that came out of mine. I ran mine in for about 15 min. at a fast four-cycle on Cox Blue can, with a Top Flite 5 1/4 x 3, then another 10 min. two and four cycle before leaning it down hard. It ran 20,000 rpm on Blue can, 21,500 on a mixture of Clean Fred's fuel and K&B 100, all with a pacifier. Cox says boring the venturi to 5/32 will help some, so I pulled the bored carb out of an old one, and the motor ran 22,500. Hey, Roy, a Grand is a bunch more! Hopefully a change to straight Clean Fred's Fuel (we've been running 60%) will pull a few more rpm. My old Cox ran better (23,000) but finally blew a crank. Would you believe I flew that motor at the '63 Nats?"

These hot Cox 1973 series 049 engines are in your hobby shops right now. There is a noticeable external difference in the engine. The new ones have a fine mesh screen over the venturi. While we're on the subject of Cox engines, for those who feel that the engine doesn't provide enough go-power stock-from-the-box, drop a line to Kirn-Kraft, 283 N. Spruce Dr., Anaheim, Calif. 92805. Dale Kirn has some goodies that will perk it up just a bit more.

Beecroft writes in El Torbellino's "Free Flyers are Cheapshots Dept.": "Here is a little tip I'd like to pass along to save all you dopers out there a few bucks. AeroGloss dope says use only genuine AeroGloss thinner—at a price you just go blind over. Likewise, other brands recommend the same—only Super Whammy works with Super Whammy, etc., etc. Try some Ditzler DTA 10, from Painter's Supply, or DuPont 3602S thinner. These are acrylic lacquer thinners, for automotive use. They are super glossy, slow curing, and powerful. They thin AeroGloss, Fuller's Butyrate, and Sig Litecote, that I know of, and probably others too. They'll clean out uncured epoxies from spray guns, brushes, etc. Cost is

(Continued on page 109)

Bob Stalick launches his C-Quell C Gas power model. The model is the "sequel" to and designed to "quell" any rumors as to its origin from Al Vela's Mexi-Boy.



# BOSTA

The elliptical wings are harder to build, but in combat it's a screamer. Try this winner just once. / by Neal White



# BOSTA

Many people wonder why I went to the trouble of designing an elliptical Combat plane. And these same people also wonder why I went to the trouble of building it. The answer to both questions is the same. I'm looking for the best possible combination of speed, strength and maneuverability, and the Bosta is it!

The idea of an elliptical Combat plane was first advanced, as far as I know, by Carl Berryman in 1963. Berryman's plane was called the Super Twister, but it was not a truly elliptical design.

I was Howard Rush's roommate at Purdue University, and as you might guess, we had many bull sessions into the wee hours of the morning about Combat and Combat planes. During one of these sessions, I suggested that an elliptical design would be the ultimate for Combat. Although Howard was convinced that it would have some advantages, he also thought it would be too hard to build. Accepting his opinion as a challenge, I immediately undertook the task of designing and building a prototype.

Several important design parameters were already set up for me. Howard had worked hard on his Nationals winning design, the Nemesis II (August 1972 AAM), so I used his airfoil, area and control system. Then I used Purdue's Control Data Systems 6500 computer to work out some of the details.

The prototype Bosta was, as Howard had predicted, heavy. But it flew better than any Combat plane I'd flown up to that time, so I resolved to improve the structure for more strength with less weight.

Some advantages that an elliptical planform has over a rectangular, or straight taper wing are: lower induced drag, improved mass distribution (it is heavy in the middle and light at the tips), concentrated structure where needed, high aspect ratio in the middle (5.35 to 1), and curved LE (so the tips don't hit the ground to break wings off when you hit straight in!).

I'm not going to make any incredible claims, but I will say that I'm seldom outrun, and never out-turned. The Bosta, due to its superior planform and structure, will survive crashes that would re-kit a lesser plane. The theory here is that, while it takes longer to build a Bosta, it takes longer to destroy one, and since it is not handy to have a wing fold in the middle of a match, you are ahead of the game with the Bosta!

## Construction

Construction begins with the making of a sign to be hung above your workbench: "Lightness is a virtue." Select all of your balsa with this in mind. If you don't know what the different densities and grains of balsa feel and look like, ask someone who does. Or check the first couple of pages in the Sig catalog.

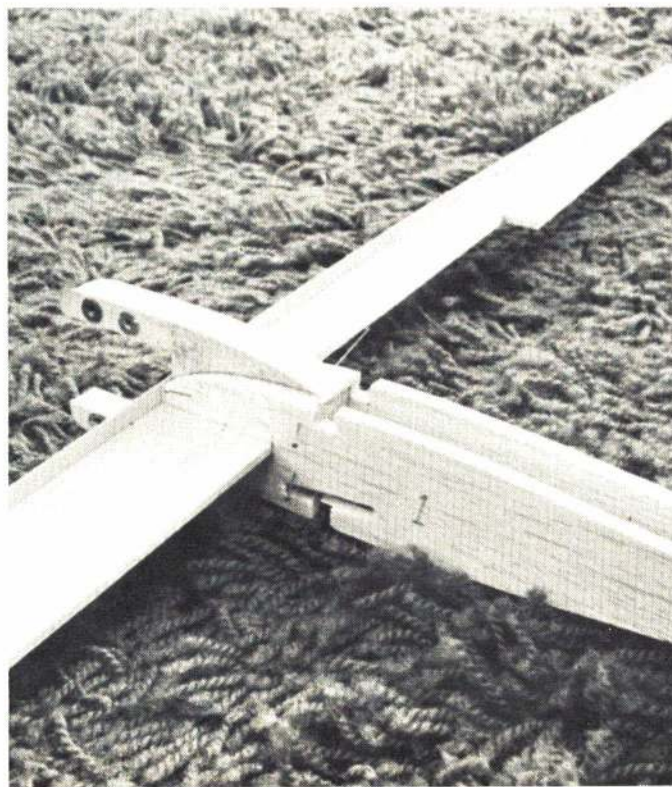
*Plans on page 82*

*Text continued on page 98*





Top: The Bosta combines strength, speed and maneuverability for one of the "prettiest" Combat models this girl has ever seen. Left: Bostas in action at the '72 Rockford Meet. Left to right: Merrill Booker, Bob Burch and the author. Right: The most vital step in construction is the joint at the motor mount center ribs and the leading edge.



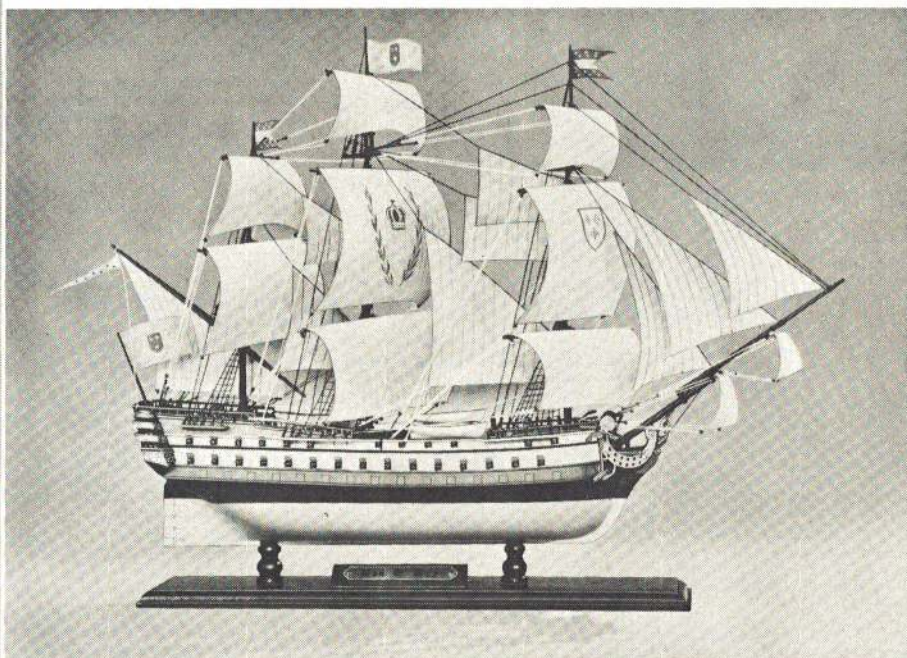
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Kit 182, \$49.95  
Length, 31" Height, 19½"



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with all QM racing rules, by Don Panek. \$3.75

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**No. 0234, Super Goose**—Very unusual flying wing RC has swept forward wings for better flying, balance, and construction. Uses a 40, stunts real well for fun flying. \$3.75

**No. 0133, Mo-Bipe**—Contest-winning Navy Carrier profile fuselage biplane. Thin wings go fast and slow. Takes a throttled 35. \$1.75

**No. 0132, Viper**—Toledo Design and Finish winner, big State-of-the-Art Pattern ship by Dario Brisighella, Sr. for good 60s and retracts. \$2.00

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**No. 0825, S.S.P. RC Helicopter**—Gene Rock's very successful large trainer helicopter needs only 40 to 45 size engine. Designed for home builder with minimum machined parts, gyro-stabilized tail rotor, all belt drive, 4 channel radios. \$6.00. Also recommended is Plan No. 0826 with full-size drawings for all special machined parts. \$2.00

AAM will present up-dates on the design during 1973 as experience of readers and designer shows need.

**No. 0824, Ryan SC**—Unusual 049 free flight scale model is low winger with excellent flight stability. Flies fast and handles wind easily. \$2.75

**No. 0823, Apteryx**—New style mylar-over-foam wing on fast, tough, AMA Combat plane by Robert Mellen. Construction offers perfect airfoil and tapered wing. \$2.25

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**No. 0721, Douglas Devastator**—Navy Carrier competitor for 40 or 60 of colorful shipboard fighter. A tough plane and a winner. \$3.00

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**No. 0421, Quarter Pint**—A 020-powered Tenderfoot free flight patterned after an antique design of 30 years ago. With decal. \$2.00

**No. 0324, 2T**—ACE-foam-winged RC trainer for 049 power carries 2-channel bricks with ease. Ample wing area for long glides too. \$2.00

## WARLORD

(Continued from page 30)

spective sides. Believe it or not there is room with some left over if they are bolted as shown on the plans, and a nutplate is slipped over the backside of the Rom-Air unit. 4-40 bolts go into this nutplate from the front of the firewall and are countersunk so that the engine backplate mount can be bolted flush to the firewall.

The engine mount must be removed to tighten up the nose gear bolts. These bolts should be secured temporarily with Titebond to prevent loosening from vibration. A 1/8" rubber spacer can be placed between the firewall and the nose gear to cut down on the vibration picked up by the gear.

**Wing:** Again, this is a relatively straightforward structure and should be jig-built. One tricky item with which to deal is the "step" I have built into the center section of the wing. This step is included so that the large fuselage fillets can blend smoothly into the wing. Normally a very thin fillet edge is used; however, this was impossible in the fiberglass version. As a result the "step" was developed which also serves to keep the wing from shifting and prevents oil from seeping into the servo areas.

Be sure to fiberglass the center section with medium-weight cloth and a good resin such as Whitewater. This is just about all that holds the wing together, but it seems to be more than adequate.

Wheel wells for the retracts can be made out of styrofoam cups, from Ajax cans or any other cardboard tubes that give clearance for the wheels. The aileron torque rods are of 1/8" music wire, and are supported at each end by aluminum bushings. The wing is an open-bay type and should not be fully sheeted if the FAI wing loading is to be observed.

Stall strips are made of 1/2" triangular stock, and faired smoothly into the center leading edge, just outside the fuselage. They serve two purposes: they cause the center section to stall before the tips (which is mandatory at high altitudes and heavy weights); and they keep the wing from shifting because they snug up against the fuselage.

Ailerons can be carved out of sheet, or built up from 3/32" sheet. Wing tip weight will be necessary to counter the offset engine and muffler combination.

**Flying Stab:** This particular flying stab is identical to the very successful Warlock. Out of six aircraft with this stab, I've had no trouble with any of them, and one ship is going on its third year of flying. The heart of the system is the 1/2 and 7/16" brass tubes which are the pivots.

The basic stab is carved out of a single piece of 1/2" sheet balsa, with the 1/2" tube epoxied in place to serve as the high point of the airfoil. Unbelievable as it may seem, a true stab can be carved by just using a rasp and sanding block. Once the shape is achieved, the stab center section is cut out with a

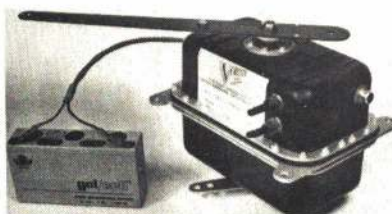
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# $\frac{1}{2}$ DIAMOND

So, here we are again, buried in the depths of a 2/3rd page black and white advertisement—but still trying to get over some meaningful info to the miniature aircraft sportsman. We have traditionally taken the newsletter approach in many of our (??) advertisements. Frankly, we have had more response to this type of advertising than to the four color approach. We will drop a four color cover ad on you from time to time, however, just to make sure Roy and Duke know that we are still alive.

## HAWK 460

Last year we introduced our first kit—the Hawk 460 (.30 to .40 cu. in.). The concept here is ① Inexpensive; ② Different—foam reinforced with wood. ③ Durable—if covered with cloth and epoxy. ④ Flies great—especially in slow flight—landing approach. ⑤ A significant difference—the Hawk is almost an ARF but it is still a model that you can work on and patch if necessary.

Major John Woods, USAF, England, came up with an idea for this type of construction years ago. John is coming to work for World Engines in 1973 when he retires from flying jet flyers for Uncle.

The Cincinnati Radio Control Model Club took on the Hawk for a building project this past winter—68 members building 68 Hawks. You should see the variations in finishing techniques. Many fuselages are being finished with laminated balsa and/or veneer.

## 1/2 DIAMOND

The 1/2 Diamond is a crazy by-product of the Hawk. We used the top wing mold—the rest of the molds for the Diamond are new. The 1/2 Diamond is ① The first really expendable R/C plane. ② Very, very quick to build. ③ Strong wing and slab sided fuselage that can be reinforced. ④ Really flies good and will handle a hot .40. ⑤ Pylon—why not fly an expendable model in pylon so you can dare and tangle in the turns? We admire the guys who take their very scale Goodyear's to the



**HAWK 460**

**\$29.98**

battlefield. 1/2 Diamonds scoot along with their somewhat symmetrical wings and the gear permanently retracted.

World Engines took on the Hawk and 1/2 Diamond projects head-on. We decided to crap shoot and to make our own foam molds which turned out very successful and quite different than the type of molds generally used in foam molding. Why do we do this? The only one reason is that we had to prove model builders can do anything.

What's the 1/2 Diamond name bit? The upper side of the airfoil is conventional—lower side is diamond shaped. We checked

this out in a wind tunnel before we went to the mat with the mold. In actuality the 1/2 Diamond flies beautifully so the wind tunnel was correct.

## NO WHEELS

How come no wheels? A landing gear complicates a model. Landing gears have drag. Landing gears rip out the bottom of fuselages. You can fly the 1/2 Diamond virtually from anywhere as it hand launches (no runway) and can be belied in on its plywood belly in grass or weeds or, if you are in west Texas, into the mesquite. All this in a box with a string for \$19.98



**1/2 DIAMOND**

**\$19.98**

band saw, through 1/2" tube and all. Then the 7/16" tube is inserted in the center section tube and S-3 is soldered to the 7/16" tube after the clearance holes have been cut out of the 1/2" tube with a Dremel tool. At this point, you should have the center section, with a full-length 7/16" tube running through the 1/2" tube, and a tiller that rotates the 7/16" tube. The flying stab halves are fastened onto this 7/16" tube by 3/8" sheet metal screws.

Finally, epoxy the stab center section onto the fuselage and install the aileron-type tiller on the tiller bar. Be sure to use a straight-line fiberglass pushrod and a good slop-free servo on the flying stab. While there are no flutter tendencies, try holding one half out of a car window doing 70 mph and notice how much force is present. If the stab is steady, very little effort is needed to rotate it, but a good amount of effort is required to hold onto it. Make sure the center section is epoxied on solidly and fillet well. Finish the stab halves with fiberglass resin to prevent warping.

At present, I still have No. One Warlord which weighs 8 1/2 lb. with fuel, a much thinner wing (10%) and a Webra 61. It has a tremendous amount of flight time behind it and I have never had any stab problems. Trust me, it works.

The fruits of my labor were evident at the 1972 Nationals. I left Colorado with a brand-new Warlord that had been flown a total of 5 1/2 min. I thought that if I didn't fly my No. One ship before the NATS, I couldn't possibly crash it as had happened before at the last two Glenviews due to circumstances beyond my control (obviously a theory born out of desperation). Once at the NATS, I found that the Warlord's uniqueness had charmed the judges as I was receiving 1-2 points per maneuver (which I didn't deserve on an untrimmed aircraft). Unfortunately, I suffered a mishap right in the middle of the NATS, not just before it, and as a result, I had to leave Warlord No. Two in a trash can. (That was before I switched to Pro-Line.) *C'est la guerre*. Who knows what evil lurks at this year's NATS. See you there!

## UPLIFT

(Continued from page 20)

Radio programming for sports and talk shows is similar to scheduling for the television medium. The stations here have public service time for non-profit use and are able to run spots for each of our meetings. Members don't need to be reminded, but others listening may become interested.

Our town newspaper has published nine major stories about us in the past three years. One story was given a full page in a Sunday edition; three more were over half a page; two additional stories were presented with pictures and front page coverage.

TV and newspapers have run items from our "Advertising Program." The items were: Armed Forces Day Flying at local Air Force Base; District Eight AMA Banquet; HIAA and AMA Delta

**WORLD engines**



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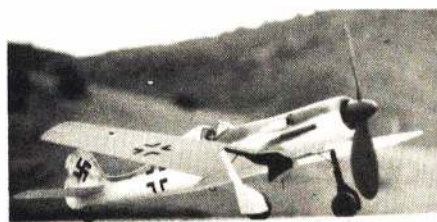
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Dart program in the City Parks Department; Flying Demonstrations at a Muscular Dystrophy camp for children; our after-Christmas Clinic for Dads with RTFs; displays in local shopping centers and stores; six-day flying demonstrations and AMA booth at West Texas Fair. Thousands of people viewed the displays and "flew" RC and CL planes in the booth.

This much exposure by the news media generated attendance at our contests. Our police department estimated 5000 spectators at the last AAA contest. Whether it be a business or a club, an image must be projected so that it can fill a particular niche in the area it serves. Our balanced advertising and promotion has paid off with a City Park designated for model flying. The park consists of a paved RC runway with fences, a paved 160 ft. circle with speed pylon fittings and fence, and two fenced, watered, and mowed grass circles with cement centers.

## FOCKE-WULF

(Continued from page 68)



ing tape to hold in place, start forming the turtle deck sheet immediately in front of the rudder. You will note the sheet will pull up in back. If there is not enough overlap you will have to fill a gap at a later time. Carefully tape the rest of the sheet down and allow to dry. Remove the tape and trim the bottom of the sheet to match the already attached side sheet. Also trim the top so it has a straight seam down the top.

Repeat this operation on the other side but don't trim the upper seam. Bond on the first side and when dry locate the second side in place and trim the top to match the already installed side. Form the remaining exposed rudder in a similar manner. When the rudder sheeting is bonded and dry, trim off 1/8" all around and sand flat. Using four layers of 1/32 sheet 1/4" wide, laminate the strips around the outline and hold in place with tape. Sand to proper shape when dry.

The motor tube is formed around a 1 1/2 in. dia. dowel. It is done like the fuselage sheet except it is soaked in straight water. If gears are not going to be used, make the motor tube 20 in. long and only 1 1/2" in diameter instead of the oval shape. Cut out the nose and rear plywood former (No. 7 & 8). Cut out the appropriate openings in each of them as required (return gear or straight tube).

Sand the nose flat and add the plywood former No. 7. Shape the foam to match the rear plywood former and glue in place with Titebond. All fitting and gluing will have to be done through to cockpit opening.

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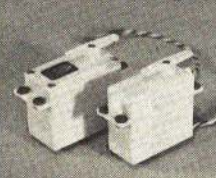
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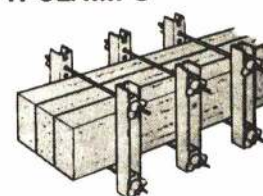
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Place the motor tube in the fuselage and install the interior cabin sheeting. The cabin floor will sit on the motor tube but will only be glued to the back former and side sheet.

**Spinner and Cowl:** The spinner and cowl may be made from block balsa or molded out of fiberglass as used on the featured TA 152. If fiberglass is chosen, proceed as follows: turn or carve the spinner and cowl out of balsa; sand smooth; coat with polyester resin and finish to a high polish. Thoroughly paste wax the mold and lay up three layers of the lightweight Sig glass cloth. Sand smooth and finish with an extra coat of resin. If you used the wax correctly they should remove very easily from the molds. If you're really ambitious you can make a female plaster or silicone mold from the wood molds and come right out of the mold with a smooth finish. Having done it that way myself I don't feel it is worth all the extra work!

At this point further work can be done to the motor tube. Cut out all the plywood formers and glue in the rear and front formers. Cut out the 1/4" hard balsa upper and lower nose plugs (1A and 2A); trim to fit the tube and glue these in place on the removeable plywood nose plugs (1 and 2). Cut out one 1/4" plywood disk 1/2" in diameter and glue on the outside of the upper nose plug. Then drill a .065 hole. Install the two eyelets making sure they are in line. If eyelets are not available, .020 brass sheet can be used, but be sure to bend over the corners and push into the wood. Then epoxy in place.

Glue in the two 1/4" plywood gear tube retainers (6) and notch to fit the gear assembly. The motor tube slips into the fuselage and drops into the two retainers. The two 1/4" plywood retainers (4A) should be glued in place and accurately aligned using the propeller shaft as a center with reference to the cowl. If this is not properly installed, your prop will not run true to the cowl.

**Gears:** Standard Boston gears were used 7/8" dia. (28) teeth. They were thinned to .080 wide and lightened considerably. The gears are mounted in a hard aluminum tube (arrow shafts work well) with ball bearings thrust washers. A loop is necessary on the backside of the gears shaft so they can be locked with a rod while winding the motors. The rubber hook shape used is an "S" hook. It is difficult to form, but the motors will tend to run much truer than on most other hook configurations.

**Wing:** The foam core balsa sheeted wing is constructed in a very straightforward manner. Use the same type foam used in the fuselage. The foam cutter used was a very simple setup. It was made from 3/4" plywood 30 in. long and one in. wide with four in. arms on each side. The wire is attached to the eyebolts mounted in each end. A wing nut is used on one of the eyebolts so the wire can be tightened as required. .020 nichrome wire was used, but .032 piano wire will work as well. Use a Variac or auto battery for power. The wire need only be hot enough to cut the foam with light pressure. Higher temperatures will be of no additional benefit.

The actual foam cutting is accomplished as follows: Mount the two template ribs one on each end of a foam block which is one in. longer than needed for each half of the foam wing core. Make sure the centerlines of the ribs are parallel. Next, take the cutter and, with a helper at the other end, turn on the power and start to cut into the foam with very light pressure. As the person handling the foam cutter on the large rib end guides the cutter over the rib, he (or she) will call out the wire's position on the rib, one, two, three, four, etc. (as the wire passes these points). At the same time, the other person matches that position with the end of the cutter. Perform this operation as slowly and as smoothly as possible, for starts and stops result in corrugations in the foam surface. After both halves are cut, smooth out the airfoil by sanding as required.

Cut out the plywood landing gear mounts and install the wire as shown on the plans. With a sharp knife, cut out the foam and insert the landing gear assembly. Glue in place using epoxy. Then install the dihedral spar in a similar manner making sure the space between the two halves is less than the fuselage width.

Next, cut a notch in the fuselage to fit the wing spar. Then fit the wing assembly into the fuselage by trimming off the excess foam in the center.

**Sheeting the wing:** For the sake of economy, splice six sheets of 1/32 together forming a sheet 36 x 18". Now lay out the panels so a minimum of

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wood is wasted. As on the fuselage, use as light a wood as possible because weight adds up quickly! Sheet the top first, use a flat piece of plywood on which to work. Drill a hole in it to allow the landing gear wire to pass through when working on the top surfaces. After trimming to approximate outline, coat the sheet with a thin even layer of Titebond. Place on the foam. Tape the leading and trailing edges of the sheet to the table and place weights on the sheet to make sure it is flat against the foam. Allow to dry overnight before removing.

Sheet the bottom in a similar manner. Once both sides are sheeted, excess material can be trimmed from the leading and trailing edges. Then install the 1/8 x 1/4" leading and trailing edges and tip blocks. Shape them to the airfoil and refit the wing to the fuselage making sure the bottom wing sheet is flush with the fuselage bottom sheeting. Remove from fuselage and coat the spar and wing ends with Titebond, then reposition on the fuselage.

Fill in the wing dihedral slot in the fuselage with 1/32 sheet. Add the 1/8 x 1/4" leading edge of the front wing fillet, and plank with 1/16" sheet. Feather edge the portion of the sheet that blends into main wing sheeting, so a smooth transition is obtained. When dry, sand to correct shape. The aft wing fillet is made from soft 1/16 straight grained 1/16 sheet. Cut to shape and feather edge all sides. Soak in water for a few minutes to soften. Wipe off all excess moisture. Bond in place with Titebond and hold in position during drying with masking tape and pins.

**Stab:** The stab is cut out of light 1/8 sheet, sanded to a streamlined airfoil. Cut a slot in the fuselage as shown on the plans; slip the stab in and glue in place.

**Sliding Canopy:** If a sliding canopy is to be used, carefully cut off the sliding headrest portion of the fuselage. Trim 1/32" off both the fuselage and the sliding headrest, and sand flat. Then plank both surfaces with 1/32 sheet. Align the upper portion (headrest) with the fuselage, trim off excess 1/32 sheet and sand to the correct fuselage contour.

The slide is made by epoxying a 3/16 dowel in the hollow headrest. The dowel should be parallel to the bottom surface and mounted up in the hollowed out headrest section approximately 1/4 in. from the bottom surface. The clip is made from aluminum (.020). It is epoxied to the fuselage so the clip holds the headrest tight against the fuselage.

**Prop:** The prop is carved from a hard balsa block, 1 1/2 x 2 x 14". After carving and sanding, mount the freewheeling mechanism as shown. Then cover the entire prop assembly with two layers of lightweight glass cloth and resin.

**Miscellaneous Details:** The *Super Charger* air scoop is carved from soft balsa and hollowed out. It is finished by applying one coat of resin and sanded smooth.

The *exhaust stacks* are made from 5/32 aluminum tubes which have been bent 30° and sawed off diagonally across the bend. Then the exhaust exit is

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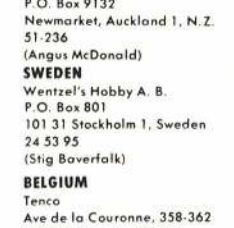
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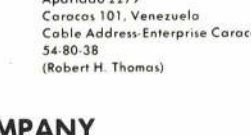
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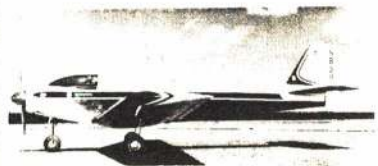
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bent to a square configuration (see drawing).

The *wheels* are made using No. 6 Trexlers for the main wheels and No. 1 Trexlers for the tail-wheel. Remove the tire portion from the wood hub and saw off both ends making sure it is at right angles to the axle (otherwise the wheels will wobble). Cut out four 1½ in. dia. and two ¾ in. dia. 1/32 plywood disks. Then drill 1/16 holes in the center of each. Glue one on the hub. When dry, place the rubber tire on the hub and glue the second disk in place. When dry these can be inflated and handle just like normal Trexler wheels.

The *cockpit step* is formed from 1/32 ID aluminum tubing with rubber tubing over the step.

The *antenna* is made from a piece of 1/8" shrink tubing which was shrunk over a tapered rod, then removed and reheated until it was soft then pressed flat to obtain a streamlined section. This is then epoxied in place after painting. It looks like the real thing but it won't break, it just bends!

To construct the *landing gear support leg*, a 1/16 hole is drilled in the landing gear support plywood. It is elongated to accept a piece of 1/16 piano wire doubled over. Bend the wire as shown on the plans, epoxying into the wing and wire wrapping and soldering to the main gear.

The *wheel covers* are made from 1/32 plywood and mounted to the gear using a brass shim stock collar.

*Finishing:* Sand the entire airplane to remove all fuzz. Apply one coat of sanding sealer (Sealette). Resand and cover all wood surfaces with tissue, then apply three coats of a 50/50 mixture of dope/thinner, lightly sand between each coat. Now epoxy the cowl in place.

*Painting:* The paint scheme is essentially whatever you want. The various reference books (listed below) show paint jobs from two-tone grey to two-toned green or brown. The actual paint used on the author's plane was Pactra flat enamel dark earth and light earth with an aero blue bottom. (You will find an air brush produces the best results.) Spray the bottom of the entire plane the color desired. When dry, paint the lighter of the two upper colors on the entire top of the wings and stab and part way down on the fuselage. When the light color is dry, paint the dark color. Use your imagination on the out-lines. The markings are painted flat white and black. For masking, Magic Mending Scotch Tape works well and produces sharp, clean lines.

The various moveable surface and panel lines may be applied with a straightedge and a felt tip black pen, or a lettering pen and india ink (if used, spray with flat clear, otherwise it is water soluble).

After the nose assembly work is completed and works correctly, epoxy the spinner on the prop and paint flat black along with everything that shows inside the cowl.

*Canopy:* The sliding portion is made from a Sig No. 9 canopy and the fixed (front portion) is bent from .015 cellu-

loid. Both items are bonded to the plane with epoxy. The window framing is made from .003 aluminum (lithograph plate). The channels are formed by bending over a piece of .032 aluminum which has square corners. This bend is accomplished by clamping the .003 aluminum between the .032 aluminum and a block of hardwood. The thin aluminum is formed over the thick aluminum by bending using a block of hardwood. Proceed to the second bend by holding the thick aluminum in place over the thin aluminum on a flat surface while making sure the first bend is snug against the thick aluminum's lower edge. The second right angle bend is made by folding the thin sheet over the thick sheet using a straight, smooth hardwood block.

Any necessary trimming can be accomplished while the channel is still over .032 aluminum by using a straight-edge and an X-acto knife. This technique gives sharp square corners. After removing from the .032 aluminum, squeeze the channel almost closed so it fits tightly on the canopy. After the canopy frame channel is correctly fitted, remove, paint, and epoxy in place using a minimum amount of adhesive.

**Motor Makeup:** Twelve strands of Pirelli are used for the motor(s) slightly longer than the distance between hooks after braiding. This is about 15 in. on the geared setup. Adjust the tension device so it stops the prop shaft with a few winds while the motor is still tight.

### Flying

Balance the airplane as shown. After making sure all surfaces are straight, hand glide (use trim tabs to obtain a fast flat wide left turn). Put a few (about 100-150) hand turns in, launch and if it tends to stall and fall off to one side, add downthrust. The power pattern should be straight or wide left with a fast flat climb. The author's plane needed down and rightthrust in order to obtain a wide open left-left pattern.

### 3-CHANNEL B-24

(Continued from page 44)

wrap clear plastic film to protect the plans from stray shots from the glue gun loaded with Titebond.

Build two fuselage sides over the side view using 1/8" square balsa for all the framework. A little extra care in fitting the diagonals will pay off in strength of structure. Leave the top longerons and rear verticals in one piece until after the sides are joined together; then use a razor saw to separate the top section.

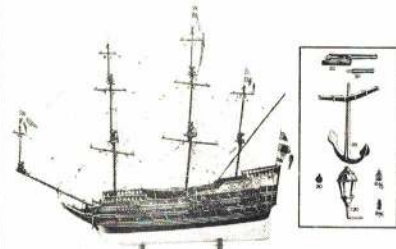
The entire top of the fuselage is removeable (aft of the cabin) by displacing the screw under the tail turret, sliding the top back about 1/4", then lifting it off. Epoxy the plywood interlocks in place being careful not to get glue on parts that are not to be glued. See side view for area of interlocks to be glued to top or bottom section. Since most of the top surface of the fuselage frame is flat, the sides are joined upside down over the top view, pinning them

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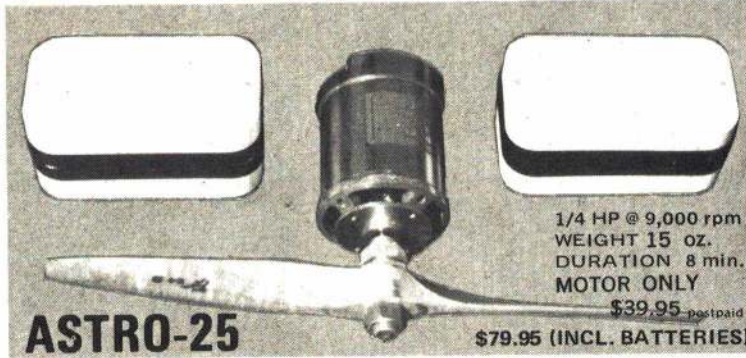
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in place with cross members in position on plan.

Cut all cross members before joining sides to assure top and bottom members are of equal length. Use adequate blocking to hold frames parallel and at right angles to the building board. When thoroughly dry, sever the top longerons and rear verticals and add 1/8" thick filler pieces at frames 7, 8 and 19. A 1/4" dia. dowel at frames 7 and 8 is epoxied in after wing is mounted on the fuselage. Reassemble top and bottom sections and glue on all formers, frames 1-19. It is a good idea to lay a piece of Handiwrap between tops of frames 7 and 8 to prevent formers from sticking to each other.

Be sure all formers are at right angles to the fuselage centerlines to make proper outside contour. Add all stringers (1/16" sq. strip except for edges of removable sections which are 1/16 x 1/8"), omitting those in the area above the stabilizer. Add the 1/8" thick balsa stabilizer supports. At rear of fuselage

epoxy in the 1/16" plywood plate and hardwood block to top section and 1/16" balsa plate and balsa block to the bottom section. Do not carve balsa block to shape until after the fuselage is sheeted.

Set fuselage aside and construct stabilizer over plan as shown. Notch out 1/8 x 3/8" main spar to receive ribs S1 and drill hole to pass rudder control cables at each end. Rudder control assembly is installed in stabilizer as it is constructed. I used Pylon .030 Gold-n-Rods which easily conform to this radius. Solder Z-links and connectors to cables at each end but do not solder cables to 1/16" brass tube until after the rudders are mounted.

Elevators are built next with 1/16" aluminum tube in place to assure alignment of holes. 1/16" dia. collars are filed flat on one side and epoxied in place with the set screw at the top surface. Round off forward edge of elevator same as S1a. Cover elevators with tissue (olive drab on top, grey on the

bottom) leaving set screws exposed for assembly and adjustment. Don't forget the elevator actuator collar and arm when assembling elevators to stabilizer. Round off leading edge of stabilizer. Do not cover stabilizer with tissue until fins and rudders have been mounted.

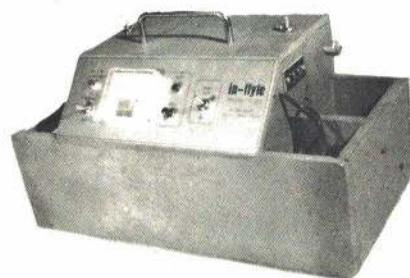
Rudder assemblies are constructed next. Make one right and one left (horn sticks out on opposite sides). Build rudders with .032 wire hinge pin in place, but be sure it can be removed. Separate fin and rudder, round off leading edges and taper R8 into the trailing edge. Rudder assemblies can be covered now, leaving the wood bare where it will glue to S3.

Note that the lower portion of the inside faces are grey, while the balance is olive drab with black edging. Glue the fins to the stabilizer, taking care to align them accurately. Hook rudder control Z-links into rudder horns and with a twisting motion slide rudders onto fins and install .032 wire hinge pins. Rudder control cables can now be mounted to

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the fuselage and remainder of stringers added.

Wing construction is relatively simple and straightforward. The 3/16 x 3/8" spruce main spar is tapered and shaped on the end as shown on the wing section from W12 to the tip before pinning to the board. Trailing edge stock is cut to length and notched out for the wing ribs over plan. Glue in wing ribs being careful to get W1 at right angles to the main spar. Note that ribs W3, W4, W6 and W7 are set at a different angle than the rest. Make an angle guide from scrap balsa to hold these ribs in position until top spars are in place. Glue on leading edge strip. Assemble pieces W14 through W18 (3/32" thick) and when dry, glue to wing at centerline of leading and trailing edges. Assemble ailerons same as for elevators with 1/16" collars epoxied in place. I used 1/16, 3/32 and 1/8 telescoping tubing for aileron torque rods and 3/32 rod for actuator arms. Add 1/16" thick sheet between ribs at nacelle locations at bottom of wings. Remove wings from plan and add bottom spars (omit bottom spars between W3 and W4 and between W6 and W7).

Nacelles are constructed directly on the wings, following numerical sequence. Fuel tanks indicated are one oz., Pylon slant style which give exceptionally long engine runs (which comes in handy if an engine or two is cranky), if different tanks are used make cutout changes as required in N3

formers. After tanks are installed, coat N3 liberally with epoxy and be sure to seal around tank to prevent any fuel getting into nacelle. Apply sheeting on nacelles but do not sheet wing yet.

Cowls can be constructed anytime. Assemble N1 to N2 with blocking of correct length, carve outside to proper curvature, then wrap with 1/32" thick balsa sheet. Cut openings in top after motors are mounted to assure proper location. Epoxy motor mounting plates (3/32" plywood) in position, and mount motors to determine best position for the throttle cables. About three degrees of downthrust is advisable but can be accomplished with shims instead of slanting the motor mount if you desire.

Wings may be mounted to top section of fuselage now, epoxying in the 1/8" filler and 1/16" plywood dihedral brace. Epoxy in the 1/4" dia. front locator dowel (leave about 1/4" of dowel protruding from frame 8). After wings are mounted and throttle cables installed, the wings can be sheeted with 1/32" thick balsa as shown on the plans.

The entire fuselage is to be sheeted with 1/32" thick balsa. Edge glue three-in. wide strips together and cover one section at a time (former to former), gluing to all stringers and formers.

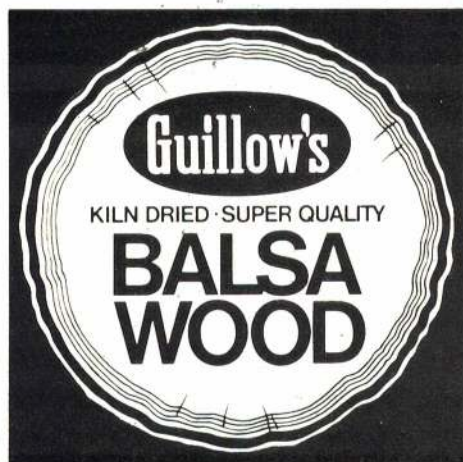
Nose canopy, cabin, top turret and tail turret are formed over carved balsa blocks, from heat forming plastic; lines are narrow strips of tissue covering material. Paint interior of areas black before attaching plastic. Edge of plastic should

butt against edge of 1/32" balsa sheeting. Epoxy the landing skid plywood plates into the fuselage (with 1/8" ply blocking in place) and locate holes in side of fuselage.

After all sheeting is accomplished the tissue can be applied. Use the grey tissue for the bottom areas first, since a small overlap of olive drab will cover grey very nicely. Water shrink completed covering but do not dope until after dummy wheels, fairings, antenna, etc. are attached—glue does not hold as well to the doped surface (especially if you use Sig Lite-Coat). To prevent green from showing through the tissue insignia, I preshrunk a sheet of extra-heavy Silkspan, then doped yellow tissue to it while it was still on the frame. Cut the numerals and the letters for the name of the plane, JOY, from it. Also cut out the fields for the stars from blue Jap tissue and dope them to the white Silkspan. The large numerals on the side are two thicknesses of white Silkspan. When dry, cut out insignia and apply to airplane with dope.

A few more details and you should be ready for the field. I made an electric starter from an old Dumas boat motor and other miscellaneous scrap around my shop, and would heartily recommend the use of some kind of similar equipment for ease of getting all four 020 Pee Wees fired up at once.

This model's flying ability needs no explanation. It performs much like a hot Tri Squire. Before launching, and



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## U.S. F.F. CHAMPS

(Continued from page 58)

bad gasket, for instead of rocketing skyward, it fluttered helplessly to the ground at his feet. Needless to say, the mock cheers and horselaughs could be heard all the way to town.

Bud Romak and Joe Bilgri dropped by on Monday after two days of Indoor flying at Santa Ana. Bud proceeded to prepare his newest superlight Unlimited Rubber model for a test flight. Half winds should just about do it; no use putting in the winding tube or removing the prop for that, eh? Zap!! Broken motor and shattered fuselage for the third year in a row. In 1972 Bud was a bit luckier, having put up two maxes before zapping it, and making his third flight with a Wakefield model to win the event.

Bill and Bob Hunter added two more to the growing list of achievements of their Satellites by placing one-two in the Night Flying event. Models flown in this event carry flashlight bulbs and batteries, but this year a new wrinkle was added. Bill Vanderbeek acquired some plastic tubes which when squashed allowed two chemicals to mix, and the

contents would fluoresce brightly for several hours.

Bob DeShields was the first to max out in Hand Launch Glider with his huge 28-in. span 120-sq. in. model, but wound up second to Bill Blanchard who again set a record with his Polly. Tom Hutchinson beat out the other 64 contestants in the Senior-Open division of Half-A Gas with his Maverick, but it was lucky for him that Juniors competed separately. David Sbur and his Starduster 350 made a slightly better score. Marty Thompson posted seven maxes with his aging Starduster 900—K&B 40 in the engine room—to set a new Senior Class C record. That must make it about the winningest model around; he built it when he was 14. Bruce Hannah, Jr. also put up seven maxes in Class B, Open with a modified Classic, also a new record.

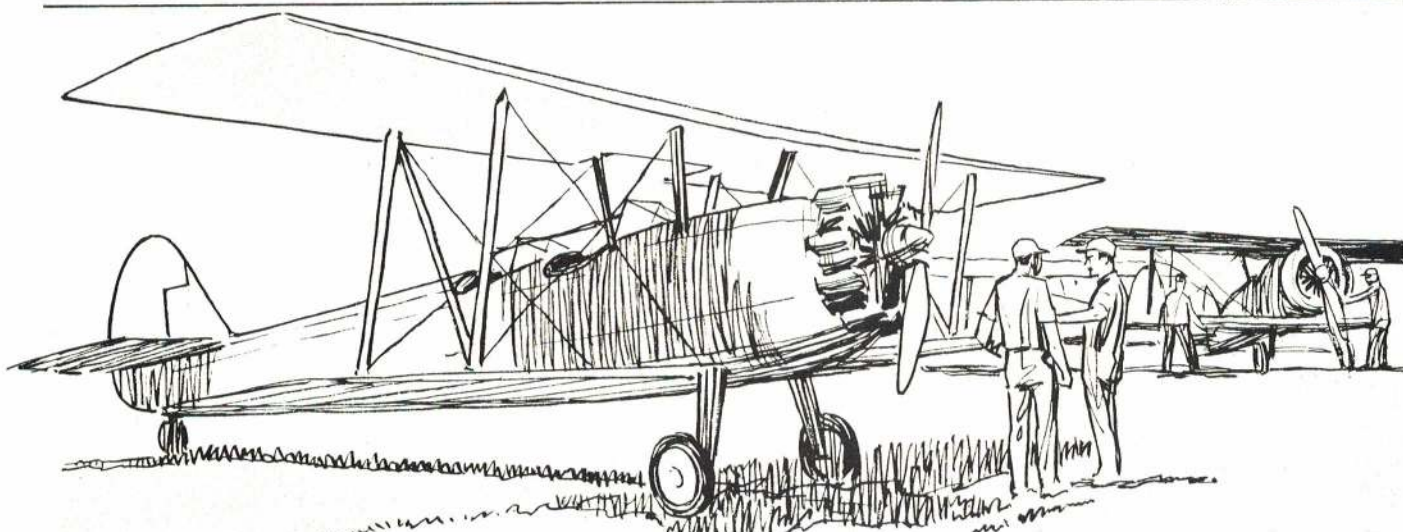
Ernst Johnson made his three maxes in Old-Timer Rubber flying a replica of Bruce Luckett's 1936 Mulvihill Trophy winner. In the flyoff, his long-motor-run model was pitted against one with a fast climb. The fast climber went up first. Ernst saw a small dust devil dancing his way, and launched his model so that it would intercept the dust devil on its first half turn. The model stood on its nose and came within a few feet of the ground, but recovered as Ernst knew it would and was soon wafted skyward, winning the event for Ernst for the second time.

George Xenakis ran into a little trouble in Unlimited Rubber because of

the torque-operated auto-stab—which his model *didn't* have. All of George's Wakefield models have a mechanism that lowers the trailing edge of the stabilizer at the beginning of the flight when there is maximum motor torque. George can launch those models in just about any direction and they go up all right. His Unlimited Rubber model is not equipped with such a mechanism, however, and must be launched with the wind slightly under the left wing so that the wind tends to toss it into its normal right turn. Well, he didn't, and it didn't and the result was a power stall and crash. Fortunately there was little damage.

U.S. Free Flight Team member Paul Crowley of Detroit lost one of his beautiful Nordic towline gliders in practice, and asked to borrow my cycle—a liberated WWII Yamaha—to use to look for it. I agreed but warned him about the clutch that doesn't quite disengage, and told him what to do if the old Wakefield motor used as a brake-return spring fails. (I didn't realize that his model had failed to dethermalize, and that he would be following its line of descent for 15 mi. across the desert.) On the way back the motor quit, fortunately near the only gas station within miles.

Many fliers at the meet manufacture various FF kits and supplies in their spare time. (You could put all their profits together and there might be scarcely enough to keep a small family in hamburger and spuds.) They supply items for which the demand and profit po-



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tential are far too small for a large manufacturer to concern himself, so if they didn't exist, Free Flight would be the loser.

Bob Oslan (Cal Aero) displayed 020-versions of the Playboy Senior and Garami Strato Streak, soon to be kitted along with his Brooklyn Dodger and So Long minies. His Sailplane is enough to make a strong man cry. Jim Crocket (Jim Crocket Replicas) displayed an adjustable balsa stripper, ideal for making odd-size or tapered strips. Frank Zaic indicated that T-56 rubber might be back on the model market now that Pirelli is no longer available, and disclosed he had recently uncovered a cache of genuine prewar handmade superfine tissue. Ken Oliver showed off a new cast aluminum alloy pan-mount for FAI power engines.

Young Randy Bunch, a Senior, deservedly won the Chuck Broadhurst Memorial Trophy for the Overall Sweepstakes, having placed high in many events. Highest time in any one event was posted by young Randy Weiler who put up his Galaxie for eight maxes to win A-Gas Junior, set a new National Record. He earned the Ocie Randall Memorial Trophy presented by Hazel Randall.

I was reminded of the first U.S. FF Champs in 1971 when Ocie was presented with the AMA Distinguished Service Award. Ocie asked, "Is Free Flight dead?" Perhaps, but it's surely having one hell of a case of rigor mortis!



"As a matter of fact, I didn't get much building done this winter. How did you guess?"

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## MYSTERY MODEL

(Continued from page 22)

down in the same wide circle. In half the time it took to climb to its peak, the Hawk is nearing the ground in a fast glide. Watch out for that tree! Oops! The model is hanging halfway up on a limb. In just a jiffy your little brother is up the tree and handing the model down. The wing is crooked where the rubber bands let it slip, but this straightens up, and there isn't a scratch on the rugged Hawk. Ready for another flight? Let's go! Wait a minute, though. Let's stop for an hour so you can build an American Hawk and get in on the fun!

**Buying your materials:** The model only takes four pieces of balsa wood. The body (or fuselage) is a piece of 1/2 x 2 x 36" balsa sheet. Select a soft piece of wood for this. You can distinguish soft wood from hard by picking up two pieces the same size; the soft wood will be the lightest.

You need two sheets of 1/8 x 3 x 36" balsa to build the wing and tail. The sheet from which you will make the wing can be a little harder (heavier) than the one you use for the tail.

The last piece of balsa needed is a stick 1/2 x 1/2 x 36". You will also need a small piece of 1/16" sheet plywood, 1 1/2 x 2" for the firewall—the place where your engine is mounted on the fuselage. Your hobby dealer might have a scrap this size he will give you. A small bottle of white glue and a single-edge razor blade are the only other things you need.

## Construction

**Wing**—The wing is first. Take the slightly harder (heavier) sheet of 1/8" balsa and cut it off to 32" long. Now take a peanut butter jar and use it to trace a half circle around each wing tip to give them the shape shown on the plans. Cut them out with the razor blade. Gently mark a straight line with a ballpoint pen across the wing at the exact center so you can locate it later when you are adjusting your model to fly.

Now for a special step: the tips of the wings must be bent up higher than the middle part that sits on the fuselage. This is called *dihedral*, and keeps the model from spinning in to one side when it is flying. Use your mother's pressure sauce pan with the little "jig-gler" taken off the lid to produce a steady flow of steam, or use a teakettle. Steam the center part of the wing

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thoroughly on both sides and slowly bend the wing like a bow. Hold the wing bent as you keep on steaming for a few minutes, then hold the bow in the wing as you let it cool. Bend the wing more than is shown on the plans, since it will straighten out a little as it dries. After the wing has dried completely (about an hour), you can put short pieces (about four in. long) of adhesive tape or masking tape over the front edge and rear edge in the center. This protects the soft balsa from the rubber band holding it on the fuselage.

**Tail Surfaces**—These are even easier than the wings. Cut a rudder eight in. long and a stabilizer 15 in. long out of the other sheet of 1/8" balsa. The stabilizer is just like a small wing except that you do not have to steam any dihedral into it. Round the tips of the stabilizer using a peanut butter jar as a guide. The rudder is left square.

**Fuselage**—The fuselage only takes a jiffy to build, since it is simply the plank of 1/2 x 2 x 36" balsa. The only cut is at the very rear where you must trim a small angled piece off the bottom where the stabilizer fits, as shown on the plans.

Glue the stabilizer onto this slanting part of the fuselage; you will notice that the back edge of the stabilizer is now about 1/8" higher than the front edge. This is one of the most important things on the plane to make it fly well. Glue the rudder in place on the left side of the fuselage. Cut the two wing rests

from the 1/2" square balsa stick. Each one is eight in. long. Glue them in place on each side of the fuselage as shown on the plans, starting four in. from the front of the fuselage to make a level platform for the wing to rest on.

Now cut the two short pieces that fit on each side of the fuselage to brace the firewall. Glue them in place even with the front of the fuselage and then glue on the 1/16" plywood firewall. Use a lot of glue on the front of your model, since this takes a lot of punishment.

If you are going to use a Cox Babe Bee out of their plastic flight trainer, you can leave it attached to the plastic firewall as it came out of the model. Simply put a nail through the fuselage right at the front, or use a wooden dowel as shown in the pictures. Then you can hold the engine in place with a rubber band looped around the nail and the plastic firewall.

If you use a Wen Mac or a regular Cox Babe Bee, hold the engine up to the firewall and stick an ice pick through the mounting holes in the engine to mark it. Use small wood screws right into the holes made by the ice pick to fasten your engine in place. But make sure the glue on the nose of the model has dried before you try this! With a Wen Mac you'll have to buy a small tank and hold it in place on the side of the fuselage with rubber bands, as shown in the photograph.

It should have taken you less than an hour to build your model, so now hold

your horses and let it dry to make sure the glue is hard. Maybe you ought to go to the kitchen and fix some peanut butter sandwiches out of the jar you've been using!

### Flying

First, lay the wing on the fuselage on the wing rests and hold it with a couple of rubber bands. Be sure to line up the center of the wing with the center of the fuselage. (Did you remember to put the adhesive tape on the front and back of your wing to protect it?) Move the wing back and forth until the model will balance about two in. behind the back edge of the wing.

Find a nice grassy field. Fill your tank about half full by turning the model on its side and squirting fuel in the top filler hole of the Babe Bee until it runs out the bottom one. Did you remember to put your propeller on backwards? This is important to cut down on the power for the first flights.

Now start your engine and adjust the needle valve until it is running very slowly and rich. Let the model go almost straight ahead and watch what it does. If it goes out a way and then noses into the ground, scoot the wing forward about 1/4" and try again. Continue to move the wing forward until the model climbs out nicely. Now, suppose your model had tried to stand on its tail and just hang there? Or, when it glided, it went up and down ("stalling") like a wave on the ocean. You guessed it. We

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would move the wing back a little at a time until it was flying right.

Our American Hawks have flown pretty well with the wing way out of place, and only the glide seems to suffer. Remember: wing forward to make it go up, and wing back to keep it from nosing up too much. This works for both the power flight and the glide! The model should turn by itself. Suppose it turns too hard to the left or the right. First, you may have the engine running too fast. Slow it down with the needle valve. But if it turns too hard with the engine running slowly, just slide the wing over a little (usually about 1/4 to 1/2") toward the side it is turning. This will make it turn the other direction.

On a calm day, we have put our American Hawks up about 500 ft. on a full tank of gas. But watch that wind. They can fly a long way during a two-minute engine run!

### BOSTA

(Continued from page 80)

First, cut the horizontal spar out of warp-free 1/8" balsa. With epoxy (white glue tends to warp this structure) glue on the 1/4 x 1/4" triangular leading edge. Notice that from rib 3 outboard, the LE tapers to 1/8" at the tip. This is the only tricky part of building this plane. Let the 1/4 x 1/4" triangular leading edge stick out in front of the spar, and sand the taper in after the epoxy sets. Attach both the top and bottom LE at the same time, and sight down the TE of the horizontal spar to check for warps. These warps are easily twisted out while the epoxy is still wet, but impossible to remove when dry.

While this assembly is drying, cut out the motor mounts and glue them with epoxy or Titebond to the 1/2" center block. Sand both sides of this assembly flat to prevent damage to an engine being bolted to an uneven surface. Saw the slots into the 1/2" center block for the bellcrank and horizontal spar. Drill the mounting holes in the motor mounts. I use an old crankcase as a drill guide.

Cut and sand out the center ribs. Remember while making ribs that an airplane is only as good as its airfoil. Only the inboard center rib needs a slot for the bellcrank mount. Glue the center ribs to the motor mount assembly, but be careful not to build in any up or downthrust. Now glue this assembly to the horizontal spar assembly, and be careful not to build in any in or out-thrust. The airplane now looks something like a crossbow.

Cut out and assemble the trailing edge. Look at the section views of the ribs to see how the TE is tapered on the inside to an almost knife edge, and sand this in. Cut out all of the ribs. You may think that there should be separate out-lines for ribs 1 and 1A. However, since there was less than 1/100 of an in. difference in length, and less than 4/1000 of an in. in thickness, I figured that one outline would do for both ribs. If you feel guilty, hit rib 1A about two extra swipes with the sandpaper. Cut out and install the bellcrank platform through inboard rib 1 into the center block.

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Mark the positions for the ribs on the horizontal spar and one of the TEs. Pin the ribs except for the outboard rib 1A into position on the horizontal spar and the TE. Sight from behind the plane and get the knife edge of the TE directly in line with the spar. When you are certain there will be no built-in warps, glue this assembly together.

While waiting for the glue to dry, cut off a piece of 1-1/3 in. dia. rocket body tube (Estes BT55 or Centuri 13xx) to 6 1/2 in. This will be the bladder tube, and needs to be fuelproofed on the inside with epoxy or urethane varnish. *Dope will not work!* Fuelproof the end plugs and epoxy them into the tube. Set this aside to dry, but don't try to use heat to speed the drying. The air inside will expand and blow the end plugs out. While making this assembly, bear in mind that any sharp points on the inside will cause the bladders to pop. When dry, slide this into the notch in the horizontal spar and add rib 1A, and some scraps in front of the bladder tube to make a partial rib.

Add the top trailing edge. Make sure to get a good bond between the top and bottom TEs. Now carefully slide the two 1/4" sq. spars into the notches in the ribs. You will have to bend them down at the ends, so check to see which way they are warped (they always are), and use this warp to your advantage.

Mark the leadout positions on the ribs and cut small holes in the ribs. A small (1/4") X-acto punch without the handle works well for this. Add the leadout wires to the bellcrank; bend a crook in the end of a 12-in. piece of 1/16" piano wire, bolt the bellcrank to the platform, and feed the leadouts through the holes in the ribs. Now plank the leading edge. I find it is easier to wet the inside face of the sheeting, glue and pin it to the 1/4" sq. spar, and pull it down over the leading edge, using lots of pins and white glue. White glue is easy to spread if you use a small (1/8"), cheap (10 cents) paintbrush, kept in water between uses to keep it soft.

When the planking is dry, sand the tip ribs square, cut out the 1/8" wing-tips, glue them to the ends of the wing, and add the tip filler pieces. The tip fillers could be hollowed out, but it is not too important. Epoxy two 1/2" pieces of 1/8" brass tubing to the bottom of the inboard tip for leadout guides. Install the pushrod in the bellcrank, and plank the center section. If you are going to use one of the plastic film coverings, use the dotted outline to give you something to keep the film from splitting when you cut holes in the film later to attach the booms. Now you can add the cap stripping. You should have enough scrap 1/16" around from the leading edge sheeting to do the job.

Now, get some coarse sandpaper, about 80 grit, and rough sand the entire wing. Be sure to use a sanding block for this operation. Pay particular attention to the radius of the LE. When the wing is about right, add the blind mounting nuts, and the engine nacelle. Use finer

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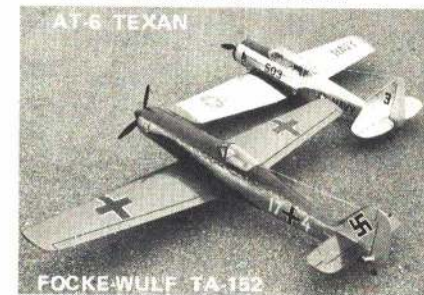
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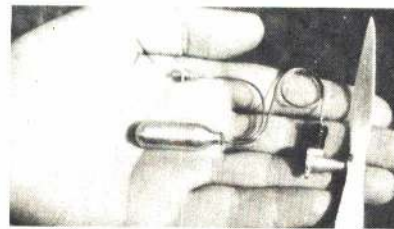
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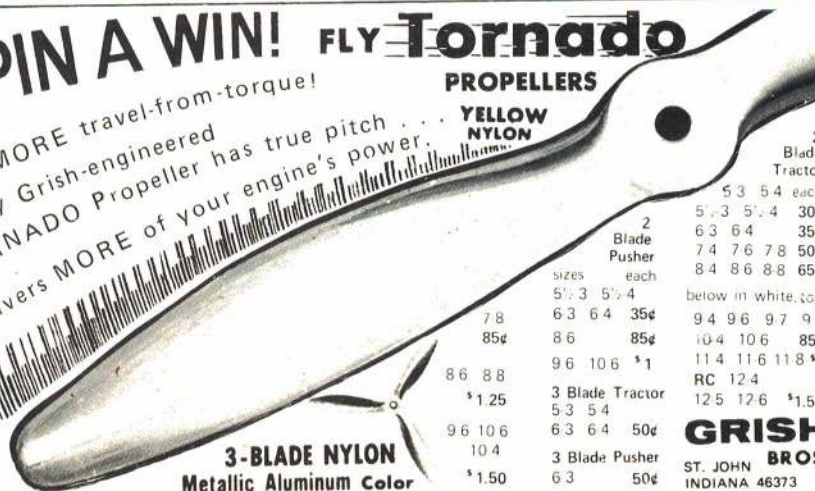
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and finer sandpaper until the wing is as smooth as you can get it. If you are using plastic covering, you can set the wing aside at this point. If you are going to use silk, I recommend giving the wing a coat of clear dope and one last going over with fine sandpaper.

Cut the stab to shape out of light C grain and sand it to a symmetrical airfoil. It helps if you are an old hand-launch glider builder. Draw a centerline around the edge of the stab to help you keep things lined up while sanding in the airfoil. When the stab is to your liking, cover it with silk to prevent splitting. Cut out the booms and sand to an oval cross section. Be sure to use bass wood (model train people use it a lot); plywood and balsa are not strong enough. Cover the booms with silk, or wrap a kind of bandage around them just behind where they attach to the wing. Hinge the stab to the booms as shown with brass bushings epoxied into the booms, and the piano wire hinges epoxied to the stab.

Cover the wing with whatever you like. I always use silk. If the wing is covered with silk, slide the booms into place on the wing, and sight from behind to see if the stab is tilted. If it is alright, use some air-drying glue—not white glue—to attach the booms. I use glue so that I can get the booms back off when the wing finally meets its fate. If you used a plastic film covering, use a sharp knife to cut away the covering where the booms meet the wing and epoxy the booms to the planking underneath. Epoxy should be used here because there is not much area available, and no fillet of glue can be used. Dope whatever parts of the plane that still need it.

Now comes an important, but often neglected step—getting the warps out. If you covered with plastic, simply twist against the warp, and iron the covering tight, repeating until the warp is gone. If you used silk, heat up some water to boiling (not just hot), and have somebody brave hold the plane, twisting against the warp, and pour the boiling water on the plane in the area of the warp. With a little practice, you will be able to straighten your planes with only a minimum of effort, and very few burned friends.

With a large X-acto punch mounted in a drill, make the pen bladder access hole by cutting two overlapping holes with the spinning punch. With the small punch, make the vent and drain holes in the outboard end of the bladder tube in the same way. If you punch through the sheeting with a pin, you will be able to find where the bladder tube is closest to the planking. Fuelproof the edges of these holes with epoxy, epoxy and bolt on a control horn, solder on a Kwik-Link, wrap the leadouts, put on your AMA number, and you're ready to fly.

### Flying

With one last check for warps, bolt on your honkin'est Combat motor and head for the field. Pick out a windy day for your initial test flight so you can keep your maneuvers downwind until you get all the bugs worked out. The Kwik-Link makes on-the-field control

adjustments easy. Put it in a hole about 7/8" above the stab, and adjust for equal up and down throw on the stab.

With the bladder full of hot stuff, and with a balanced prop on your motor, try a test flight. First check to see that as you fly level, the plane isn't banked in or out. Try the same thing inverted. If the plane banks, then you missed a warp. Don't try anything else until you get it out. If it looks OK flying level, do some big loops, both inside and outside. If it shows any tendency to come in, then either you are still over-looking a warp, or your stab is tilted. If the big loops looked good, then let it all hang out! Try a bunch of the tightest loops you can do, all in a row. There should be no slackening of the lines. If there is, suspect a warp or tilted stab. The plane should not slow down significantly. If it does, try less stab throw, or a lower pitched prop, or a honkin'er motor. Experiment around to find the best combination of motors, fuels, plugs, props and stab throw. I use a "warmed up" Supertigre with a wooden 8-8 burning 40% nitro, 40% methanol, and 20% synthetic lubricant.

A well-built Bosta will survive a high-speed mid-ground with surprisingly little damage. But mid-airs are another story. Because no one has yet figured out how to make a balsa structure stronger than aluminum, mid-airs will remain unpredictable, since the motor of the hitter usually contacts the balsa of the hittee. But the Bosta fairs better than average in these situations.

## S.E. 5a

(Continued from page 72)

flat surfaces. This glue eliminates smearing and wiping off.

I used index file cards for the plane's numerous panels in the nose section. The aluminum cowling provided helps, but you will need more than that for full-scale appearance. Cut the panels and bands to shape from the cardboard. Add the small rivet detail by running a dress-maker's tracing wheel on the backside where needed. For larger protrusions, the cardboard can be punched with a rounded nail by careful hammering with a block of wood underneath. Spray the panels and strips with 3-M contact glue,

allow to dry only until tacky and then put in position.

Hinges can be simulated with small pieces of wire or string glued in place. The same can be done for paneling on the landing gear. This is an easy, neat way to achieve the profuse paneling on this plane. Get a good supply of 00-90 and 0-80 nuts and bolts from Sig and glue into predrilled holes where needed. Again, check scale views and photos.

The inspection windows on the wings, on left of Vickers gun, and illumination window on right of cockpit can be made in a similar manner by cutting the "frames" from cardboard and contact cementing to clear plastic. The whole window is then glued in place with the plastic masked for subsequent painting.

By experimenting with thin cardboards of various surfaces, you'll find that extremely sharp appearances can be obtained and a usually difficult job is actually fun.

A feature you won't want to leave off from the S.E. 5a (so characteristic of the British planes) is the stitched panels along the fuselage sides. After checking many books and diagrams I found that various methods were used. On the S.E. 5a it was not the zigzag stitch so often depicted on models. Apparently string was put into a hole with a curved needle and drawn outward leaving string slanted only in one direction. This was easily simulated by laying two pieces of masking tape down on fuselage about 5/16" apart along the seam line. Pieces of fishline are then cut to lie in this space on an appropriate slant. Use a sharp razor to keep the ends clean.

Spray many pieces of the string with 3-M cement and put in place. Follow with several coats of dope and seal the string so that subsequent sanding does not cause a fuzzy effect. Then, with a good knife, cut through fabric along the intended seam and lift fabric away enough to show the pieces of fabric being held together by the "lacing."

After searching for the right material for screening on the upper front radiators, I came across the stiff gauze backing found on large bandages. It can be cut and glued without falling apart and it has a mesh that is fairly close to scale. While on the radiator, make the panel that curves over the top piece

from thin aluminum. Drill a hole in it and epoxy an old needle valve cap to simulate the filler cup.

Metal braces for exhausts, gunsights, etc. were fashioned from brass tubing and soldered with Silver-Brite solder. This solder is very strong for delicate construction and flows easily at ordinary soldering temperatures. Measuring is the hardest part in constructing these so proceed carefully. It's a good idea to make a mock-up from cardboard or wood first and then duplicate with metal. These details give supporting and should be fastened carefully with 00-90 or 0-80 nuts and bolts. Be sure to glue thin plywood on the inside of fuselage in each location of a screw or bolt to add strength around the hole.

Figure out shape of instrument panel and cockpit stiffener by making various cardboard templates. This will take several trials until the proper fit is obtained. Be sure to shape it before addition of balsa paneling on this area. The panel is cut away on top for the Vickers gun mount and Lewis ammo case and also has hole in the middle for the near vertical British compass. Cut final shape from 1/16" plywood, stain and dope. Figure out location of dials, pipes, etc. and finish the whole board before proceeding. You'll find that adding the instruments to the dashboard and then gluing the whole assembly in place is easier than gluing each dial on later.

The many round details such as cockpit instruments, prop hub, disc, etc., were made from oversized plastic and metal discs chucked in a 1/4" drill and turned with knives and files. Dial cases with wide flanges and depressed centers can be obtained this way. By adding small Sig rivets on the flange a fairly accurate dial case results. I wasn't able to duplicate the actual dial face so I cemented I.M. dial faces in place on the various dials. The knobs and pump handles, so numerous in the cockpit, can be similarly fashioned with stock turned in a small drill. Again, check the Bourget booklet for instruments used and location.

Expansion pipes on top of the upper wing are easily made from music wire and epoxied in place. On the real plane pipes leading down from the upper wing to engine entered the top upper cabanes and came out at the bottom where they went into the engine compartment. This can be simulated by gluing soft wire under the taped cabane struts at top and bottom to simulate a pipe entering and leaving the strut. Where pipe couplings are needed, be sure to slip on a small piece of black rubber tubing before the "pipes" are glued in place. Fashion hose clamps from small, stiff wire.

For the cockpit cowling, obtain some thin leather scraps from a shoe repairer. Carefully peel the upper surface of the leather away and use the very thin, pliable material that remains. (I don't know if this is possible with all leathers, but it worked well for me.) Cut into a thin strip to attach around the entire cockpit up to the headrest. Spray with contact cement, allow to "tack up" and then apply. If adhesion isn't

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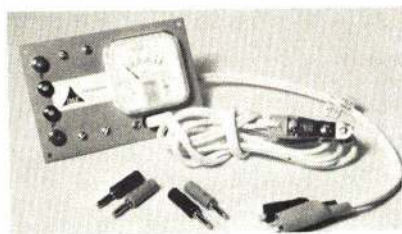
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strong enough for your particular leather, brush some contact cement on the wood also and glue on the leather.

Stain the interplane struts to desired color and dope to simulate a varnished appearance. Check three-views and you will find at the top and bottom of each strut a metal sheet that wraps around it and also serves as an anchor point for cable braces. Make patterns from cardboard first and then cut from thin beer can aluminum. Drill out lightning holes and epoxy onto the strut. Make several holes with a small drill and glue in some small rivets as seen in side views in Bourget's book.

The Foster mount for the Lewis gun is made from 1/4" plywood and sheet aluminum. The curved part attached to the Aldis sight mount is cut from 3/32" aluminum and capped with very thin aluminum on inside and outside at curve to simulate piece of channel metal. Proper fit of the gun and mount can only be accomplished with the upper wing in place. (Again, make patterns in cardboard first.)

With some extra work, a bracket can be attached to the Williams Bros. Lewis gun to make it moveable on the metal rail like the real one. Obtain an extra Williams Bros. kit so that you will have an ammo magazine to put in the holder over the dashboard for realism. You will probably need extra gun parts anyway, since the mounting position on the upper wing makes the Lewis gun quite vulnerable. Addition of the trigger cable from the Lewis gun through the fuselage

side to the control stick is a step that can be left until almost completed.

The protruding cylinders and exhaust pipes of the S.E. 5a are characteristic of the craft, so give them extra attention. Shape the cylinders that come with Top Flite kit and to be exact, add enough balsa to each block so that the irregular projection on the rear of each cylinder head can be shaped. After shaping, slice about 9/16" off the top of cylinder with a saw. Glue a piece of cardboard or 1/32" plywood between the two pieces to simulate the flange of the head cover. Add small rivets around the flange. Seal with dope or your favorite filler and paint dark grey. Add plywood inserts on back on these blocks so that screws can be used for attachment onto metal engine cowl later.

After shaping the long exhaust pipes, add a small wire or any suitable material to make the welded seam that extends around the first five in. of pipe. Glue the manifold pipes onto the exhaust and shape 16 attachment plates for the manifold and head. These can be made from plastic, metal, or cardboard. Make sure they are identical! If some are a different shape, they will ruin the effect. Glue two together to give a mechanical connection appearance and drill the tabs for small 0-80 bolts. Add some contact cement to the nuts and bolts before attaching to prevent loosening later. Slip each pair of plates on a manifold pipe and epoxy the whole assembly together. The ends of each exhaust pipe had

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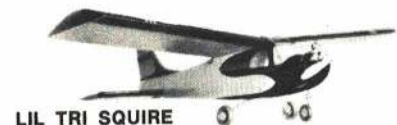
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several small holes and slits. A Dremel cut-off disc works well for the narrow slits.

The real plane has large control horns, but it would be hard to make them functional on the model because of location. However, they can be made to move cables in and out of the wing for appearance. Scale up shape and size from drawings and cut from tin plate or brass stock. Allow about 3/8" length for insertion into wing. If you study photos and drawings, you will note a large knob on top of each horn where the control cable was anchored. This can be fashioned by adding large blobs of solder on the end of the metal horn and filing to shape. Drill a small horizontal hole through the knob and pass a piece of control line cable through. Anchor with epoxy allowing about six in. on each side for final measurement.

Carefully slit covering on upper ailerons near leading edge between the closely spaced ribs and insert the aileron horn. Drill a small hole in a rib in line with the "fake" horn and over the functional horn on bottom of the aileron. Adjust length of cable so that 1/4" can be epoxied into this hole later. This part of the cable will be permanently attached to the aileron while the front part of cable will move in and out of the wing. Decide on the approximate place of entry for the front part of the cable and allow about 1 1/2" extra. A hole can be made here with a pin after painting and rounded application; the cable will slip easily in and out with movement of ailerons. Follow the same procedure for rudder and elevator horns, but make final attachment only after final painting.

All landing and flying cables were made from control line cable with Proctor turnbuckles and clevises used for adjustment. Tabs furnished with the kit work well for attachment. This is easier than using the solid wires with kinks as suggested in the kit. The latter, of course, departs from scale appearance. In most cases No. 2 turnbuckles and clevises can be used. With small No. 0 turnbuckles, such as in the tail section, anchor wires will have to be used since the clevises only fit No. 2 turnbuckles and larger. Swage fittings in all cases can be made from short lengths of small copper or brass tubing. Keep the tubing as small as possible so as not to detract from scale at these points.

Your patience will have worn away by now and you will want to add color. The undersurfaces of wings, however, should be left white and, if you used Coverite, only a slight yellowing is needed to duplicate the unpainted fabrics of the original. The fuselage and wing top surfaces are olive drab. Add talcum powder or boric acid to dope for flattening. Experiment with the amount needed since it will vary with different dopes. I prefer Johnson's Baby Powder because it is so fine and makes such a nice smelling model!

After basic painting, cut squadron markings as desired from contact shelf paper and spray paint lightly so that letters and numbers aren't too bright. The contact paper stencil technique

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gives a much better effect than the kit decals. The tail stripe decals are next to impossible to apply to the curved edges of rudder, so paint these on as well.

The final touch of realism is the weathered look. With a Binks Air Brush, I tinted the olive drab slightly and sprayed in appropriate places to break up the freshly painted look. Then mist black on areas vulnerable to oil, dirt, etc. on the real one.

This was my first scale model and I found, like many other addicts, that you never seem to finish. A new picture or a friend are always turning up hidden details that must be added. Just one compliment seems to make all the effort worthwhile.

The Top Flite S.E. 5a makes an excellent beginning WW I scale kit. Since the basic building is so easy, you have an accurate foundation for detailing if you so desire. See you at Rhinebeck!

## UNDERGROUND RC SPORT

(Continued from page 12)

The relative growth of the sport is often questioned. The absence of the usual indicators of a thriving hobby field, such as advertising for its products and the regular appearance of feature articles about equipment and events, could lead the casual observer to conclude that the sport has faded. Although it is true that advertising in the popular RC magazines has dwindled, especially when compared to the explosion of the 1970-71 period, it should be noted that at least four manufacturers of chassis kits advertise regularly in the ROAR newsletter and generally have backlogs of unfilled orders. The sales of consumable parts are brisk. These include tires, brake devices, bodies, and engines. In

fact, last fall and winter there was a critical shortage of engines and engine parts. A truer picture is that new people are entering the sport and many of the earlier RC car owners are still running their cars.

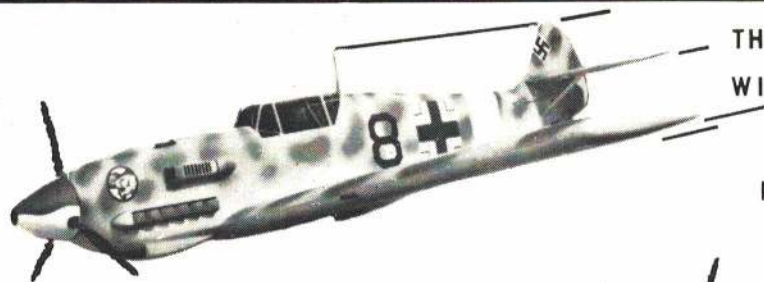
It's not surprising that there are almost no articles about the technical aspects of RC cars. The most obvious reason is directly related to the primary goal of the sport—competition. Car builders tend to be a secretive group. Roger Penske doesn't tell Andy Granatelli how he is setting up his Indy car. Most of the really serious RC racers are true innovators, always looking for a new advantage. Once discovered, an improvement is not publicized to the competition. Sometimes a flattering question might start a flow of information, but more often the response will be just a nod of the head or a quiet smile. The only exception will be to help a beginner, and then there is almost too much advice available—but only until he gets into competition and then he is on his own.

A typical series race begins with early morning registration. Drivers register as either Amateur or Expert. An Amateur is someone who has never won an Amateur event in a previous season. Once an Amateur driver wins a feature event, he must move to the Expert class the following year. An ambitious beginner can enter as an Expert if he so desires. Separate races are run for each class.

Following registration, cars are inspected to assure compliance with ROAR specifications. Items such as engine displacement, fuel tank capacity, overall car width, tire diameter, tire width, and the dimensions and locations of air control devices and cooling cutouts must be within legal limits.



"See that ugly one pulling the red nordic? That's my Harry. Why would you believe that yesterday his arthritis was so bad that he couldn't mow the lawn, wash the car, or even open a bottle of pickles for me? Boy Harry, you just wait!...."



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Then a practice session is held to give each competitor approximately the same amount of time to learn the course and to set up his car. The process of adjusting a car to suit a particular course is a complex task. Surface texture, temperature, course layout and its slopes it may have are the natural factors that vary from track to track. The car variables include the gear ratio, tire widths, type of tire material and its softness, front suspension spring rates and the maximum steering angle of the front wheels.

The relationships of these variables is intriguing. The gear ratio affects the top speed potential as well as the acceleration rate. A good top speed is essential on tracks with long, straight sections, however, when geared for a fast top speed, the car will suffer in the turns because there may not be enough torque available to promote slide which has proved to be the fastest way to go through a corner. The gear ratio, along

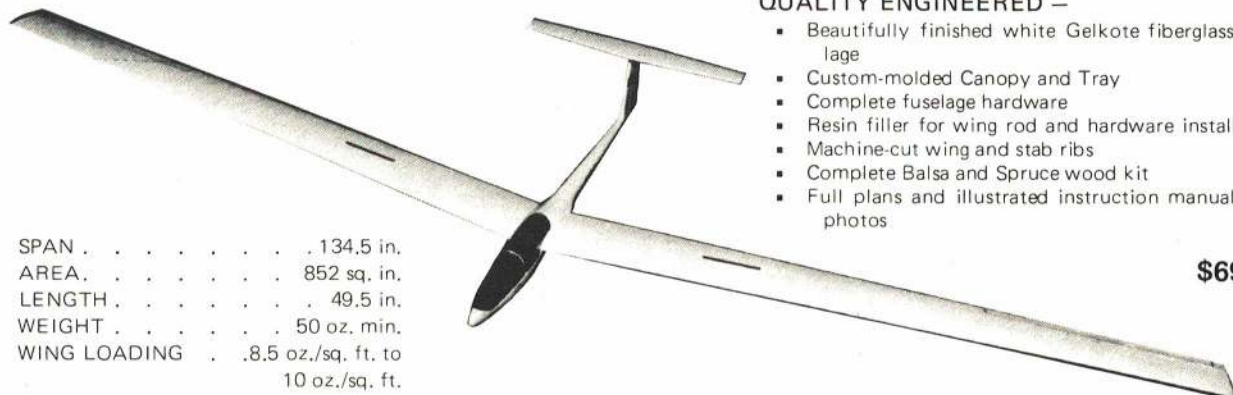
with the carburetor size affects the rate of fuel consumption and the results can be dramatic. It is not unusual to have some cars travel 30% farther on the same 4 oz. tank of fuel. More than one race has been lost by a fast car that suffered from excessive thirst.

Tires are usually the most important variable affecting the cornering ability of a car and during practice much testing takes place. Wide, soft tires give the best adhesion, but they bounce and wear too fast. More important than ultimate traction are balance and controllability as reflected in a car's tendency to oversteer or understeer. It appears that a mild understeer is preferred by most drivers. Such a car will overrun a turn rather than spin out. Understeer is achieved by reducing the relative adhesion of the front tires by fitting harder or more narrow tires, by increasing the stiffness of the front springs, or by reducing the maximum turning angle capability of the front

wheels. Wide, soft rear tires also tend to promote understeer because they require more turning force to make them deviate from a straight course. Other front suspension variables are castor and toe-in which are used to improve a car's self-centering ability. Wings and air dams at the rear of the cars aid traction and also help them go straight at high speeds.

When a driver is finished setting up his car and takes it for a few final practice laps, his technique will be sort of a toss-and-catch process. When entering a turn (any turn), he will probably throw the steering to the full lock position and the radius of the car's path will be controlled by the amount of power applied at the rear wheels. The more power or speed, the larger the turning radius. Backing off on the throttle allows the front tires to regain some traction and pull the car toward the center of the turn. This is why it is desirable for drivers to adjust their cars to understeer

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and to be very smooth and predictable when going through a turn. Each track requires new settings to achieve these goals.

The practice period is usually a time of intense concentration for the drivers, and spectators will find it's not the best time to ask questions. There's no harm in some quiet snooping, however. Practice time affords the best opportunity to examine the equipment. Most adjustments require the removal of the body exposing the chassis and components to probing eyes (and cameras). Details such as the location of the servos and fuel tank, body mounts, vibration and crash protection methods, linkage arrangements and strengths, front suspension details and settings, tire widths and materials, carburetor, exhaust, heat sink and brake system designs should be studied. Beginners can always benefit and many expert racers find better solutions to their own problems in the cars of their competitors.

This year, two of the most significant design improvements noticed involve the radio equipment. Through a few mysterious modifications, the high-performance servo has evolved and the response speed borders on the unbelievable. The difference is about the same as comparing the return rate of a telephone dial to the speed of a mouse trap being set off.

Another change used by several drivers is to wear their transmitters rather than carry them. The control pots are contained in a small hand-held unit connected to the main transmitter by a bundle of wires. It looks like a fine idea because it gives the driver more mobility. When refueling his car a driver keeps the control unit in his hand and can blip the throttle to keep the engine from stalling; there's no chance of damaging the transmitter by setting it down too hard or by dropping it.

The next step in a series race is the qualifying process. The objective is to rank the drivers in each class according to radio frequencies. The top scoring driver on each frequency earns a place on the starting grid for the main event of his class. Usually each driver runs in as many as four heats or qualifying races. The finishing positions, number of laps completed, as well as the elapsed

times are recorded and used to determine the qualification standings.

Sometime during the day a Concours event is held to select the car with the best appearance and workmanship. There is a special trophy awarded to the owner of the winning car.

The main Amateur race precedes the main Expert race and is usually shorter. At the Series 73 East race on April 8, six cars started in the Amateur race and seven cars started in the Expert race. The track was on asphalt with the course marked by inner and outer painted lines. Total length was about 600 ft. and included a 165-ft. straight section. To cover the 50 laps the cars had to be refueled.

In the Expert race, the second place car covered 49 laps and the third place car completed 48 laps. The competition was close throughout the entire race with the lead changing hands five times. Spectator excitement ran high as the race ended. The winner drew a fine round of applause as the checkered flag fell. Trophies were awarded to the three top finishers of each class. After the race many spectators commented on the realism and suspense and asked when the next race event would be held. There is no doubt that RC car racing has a broad appeal.

As exciting as the end of the race was, an equally exciting moment took place when the race started. Those who were standing near the end of the first straightaway when the tightly packed group roared by with their unmuffled engines nearly flat-out, experienced a fleeting scene and sound that cannot be equalled in any other RC activity. You had to be there—as the old cliché goes!

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## FLY BABY

(Continued from page 76)

Fly Baby has an open cockpit, permitting its occupant to feel the wind in his hair. And that attracts a lot of attention at airports—yet another appeal of flying a homemade airplane.

Since the introduction of the Fly Baby 11 years ago, it has become one of the major types among American builders. Much of this popularity has to be credited to Bowers' ability to communicate the airplane's personality through his own. Pete doesn't just tell interested pilots how easy it is to fly, he lets them fly his airplane. Hundreds of pilots have flown his prototype at fly-ins and air shows all over the country and then gone back home to start building their own.

The design started out a long time ago, at least by aeronautical standards. In 1951 Pete began to design an all-wood airplane with an inverted gull wing, like a Corsair, to be called Fly Baby. It got as far as a mock-up in the living room of his houseboat before other sidelines like soaring, photography and writing pushed it aside. When the EAA design competition came along in 1957, the original design was shelved in favor of a simpler, cheaper plane—strictly for beginners.

It was based on a series of homebuilts from the Pacific Northwest. First came Les Long's Longster before WW II. After the war, Tom Story built a variation called Little Gee Bee, which George Beaugardus (G.B.) flew from Oregon to Washington, D.C. in the summer of 1947. This was to show the CAA that homebuilts were safe and practical and that they should be made legal, not only in Oregon, but throughout the entire country. The CAA bought the idea and gave the job of rewriting its regulations to Bob Burbick, later to become one of EAA's strongest boosters.

With this historic precedent as background, Pete Bowers began to extend the scope of his design to the entire country. He kept the basic design philosophy of the Long and Story airplanes: good performance from low power with long wings, meaning low span loading. Wire-braced landing gear and wings meant strength with a minimum of weight. At Fly Baby speeds, the drag of

a few wires meant little. Anyone in a great hurry would be advised to build some other kind of airplane.

The most unusual aspect of Bowers' design was its built-in adaptability. Right from the start it was intended to be with wheels or pontoons, with one wing or two; the structure would handle all the special stresses. Predictably the biplane variation attracted the greater interest, since homebuilders have a special feeling for open cockpit two-wingers.

As Pete learned very early, converting a monoplane into a biplane involves considerably more than simply bolting on a top wing. If there is to be room for the pilot to climb into the cockpit, the upper wing must be forward of the lower, i.e., with positive stagger. OK, but that moves the center of lift so far forward that the airplane becomes seriously tail-heavy. To correct that, Bowers swept the biplane wings back a full 110°, producing an effect not unlike that of the deHavilland Tiger Moth. This, in turn, brought improved aerobatic performance, in trade for reduced speed.

Even before Pete was able to convert his prototype, N500F, into a biplane, one of his plans purchasers, Jim Hulet of Littleton, Colorado modified his with the help of specs and sketches from Bowers. Completed late in 1968 with a 75 hp Continental engine, it gets off a mile-high runway in a mere 300 ft., cruises at 85 mph and stalls at about 40 mph.

Not long afterwards, Bowers flew to the EAA Fly-In, in Oshkosh, Wisconsin, in his original, which had become a Bi-Baby. Again, he demonstrated its gentle flying characteristics by letting a variety of pilots take it around the pattern. The long-term quality of his design was becoming more and more widely recognized.

Less than two years later, in spring 1971, the first two-seat Fly Baby took to the air at the hands of builder Oliver Kromminga, of Sacramento, California. Did the widened fuselage and increased weight upset the fine handling of the little plane? Not according to Oliver: "It handles like a kiddy car on the ground, and in flight, with full test-flight crew, it handles more like an Aeronca Champ." Praise, indeed!



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Monoplane or biplane, single-place or two-place, the Fly Baby is obviously one of the finest little airplanes to come out of the American homebuilt movement. It may not be able to do multiple snap-rolls like a Pitts Special, or steam along like a Formula One, or raise eyebrows like a Breezy, but it continues to appeal to many people. In a recent issue of *Sport Aviation* (the official EAA magazine), 248 more airplanes were listed under construction by members. Of 45 different types in that list, the second most popular was the Fly Baby, with 26 examples.

No one knows how many have been completed, or how many are being built today. Certainly 100 have taken to the air and twice that many are in the works. Each represents about three or four years' total part-time effort. The sum of all this dedication is the best possible evidence of the success of the 1957-62 EAA Design Competition, which was won by an ordinary little airplane that many have come to consider very special.

## ON THE SCENE

(Continued from page 14)

Twenty-seven contestants registered for the meet, about half of whom were from the local modeling community, the rest Americans and Chinese members of our club. The national champion of the ROC, Mr. C. T. Chen, and his brothers from Taichung City were among the registered contestants. Also present was RF-4 pilot Lt. Col. Dave R. Commander, 15th TRS, Okinawa, who acted as chief judge and demonstration pilot. Dave won one of the 1965 U.S. NATS first place trophies and can only be described as one of the most interesting and experienced pilots around.

The contest consisted of takeoff and climb, loops, rolls, spins (as many of the last three as possible), touch and go, four-point roll, landing pattern, spot landing, and static and flying bonus points. Time limit for flying was five min. and such things as taxi out, parachute drop, engine start with one flip, etc. all brought extra points. Static judging was based on engine size, workmanship, scale, accessories, number of channels, etc. By scoring in this manner a plane did not have to have the best pilot behind the sticks to win. One fe-

male entrant, Mrs. Pan, displayed a beautifully finished semi-scale Cessna but didn't fly it. Yet her final score was more than some that did fly.

Mr. Chen, the Taiwan champ, took first place with his brothers right behind. They flew, as usual, with a skill that makes watching a pleasure. Prizes were kits and accessories all the way down to eighteenth place!

Food and drink was supplied by the club and, with the help of local police, crowd control was no problem.

For a first-of-its-kind event the club is extremely happy with the results and attributes the success of the show to the brilliant planning and execution of contest director Lt. Col. Bob Stamm. Outside of the usual late entries and balky engines that necessitated putting someone back to the end of the line, the event went off perfectly and finished before scheduled time—a true indication of efficient planning.

## HANNAN ON FF

(Continued from page 64)

sponsors may offer certain hydrodynamic advantages over the more common single and dual floatplane configurations. Wing-tip floats seem to be particularly trying; if one dips even slightly in the water, the model is almost certain to pivot around it preventing takeoff. However, models of each type can be made to ROW with skill and persistence; the list of winners includes virtually every variation.

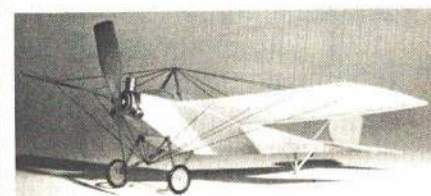
Bill Warner captured first in the Rubber-powered division with a Peanut Scale Draine Turbulent, modified from a Peck-Polymer kit. Second place went to a Jumbo Puss Moth (over 48 in. span) flown by Hal Cover and his mechanic Marilyn.

In the Gas class, Jim Adams placed first with his faithful Loening. Bob Haight drove all the way from Las Vegas to participate in this meet and scored with his WW I Hanriot

Jim Adams uses an electric starter on his diesel-powered, three-year-old Loening amphibian which won this year's Flightmasters' ROW FF Scale event.



Two models by Don Sullis. At top is CO-2 powered Sperry Monoplane. Peanut Scale Eastbourne Mono is lower picture.



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# TESTORS

## Hobby Model Products



Is there a more beautiful sight? Note even drops of water falling from the floats after liftoff. It is Hal Cover's jumbo size rubber Puss Moth.

Beautiful and well-detailed rubber-powered French monoplane by Walt Mooney even has scale type floats.



Bipe. He came out a loser in an argument with his prop, however, to the tune of several stitches in his fingers—at RC prices!

In RC, Joe Tschirgi triumphed with his WW I Brandenburg flying boat, while Granger Williams flew the vintage Deperdussin racer to second spot.

Walt Mooney carried off CO-2 class honors with his Brown Jr.-powered "Darn-near Dornier."

This sort of outing offers a pleasant change of pace from the many "serious" contests. We suggest that more clubs give ROW Scale a try. Most of us expect certain Mother Nature handicaps in terms of wind and inclement weather, but wait until you try coping with out-of-scale waves!

## STALICK ON FF GLIDERS, POWER, ETC.

(Continued from page 78)

about \$3.00 per gallon. That's for the best. I've used primer acrylic thinner, which is super fast curing, really cheap, with as good a result. It may pick up blush more easily though, with the fast drying. It's about a buck and a quarter a gallon. Regular lacquer thinner will not work. It must be acrylic."

What's In a Name Dept.: Modelers have a way of telling it like it is, so when they name their latest creations, it seems as though the model performs as the name suggests. Witness such famous performers as: Sailplane, with a legendary glide unexcelled in modern model-



Wayne Drake with the predecessor to his Sky Spangled Star Banger A-2 Glider.

ing folklore; Zipper, with a climb so fast that it made its designer's name a household word; and Starduster, a model which is the unequalled champion of present day models. These names conjure up excitement, excellence in performance, beauty, and the epitome of free flight. Then, there are the names seldom heard of. For example, not many would name their new design Toadstool, Crudbarger, or LooseGoose. Models with these names are almost certainly doomed to mediocrity.

In doing a little research, however, I came across some model names which cause one to conjure up visions of their probable success based on their names.

Here are some names and the visions I conjured up: Allegro (an FAI Power Model by Dave Linstrum) sounds like a musical score played by the Lawrence Welk orchestra; Sky Spangled Star Banger (an A-2 by Wayne Drake) is a masterpiece of titling, but it really belongs with Allegro—see above; Lawrence Wake (a Wakefield by Bob Stalick) and... a one... and a two. See Allegro and Sky Spangled Star Banger above; Up Chuck (a hand launch glider also by Wayne Drake) is an appropriate and self-explanatory name to anyone over 40 years old who has tried to throw a two-oz. glider. It also explains what happened to the person who didn't care for the Sky Spangled Star Banger played Allegro by Lawrence Wake.

## MEUSER ON FF SPORT

(Continued from page 52)

New Cox Tee Dee 049: The latest version of the most popular competition engine has changes in the bypass, timing, compression ratio, and increased crankcase stuffing. In addition, flats near the top of the cylinder are used, with a special spanner, instead of a wrench placed across the exhaust ports. A special reworked version, having a fine-pitch needle valve and polished crankshaft, is marketed by Kirm Kraft, 283 N. Spruce Drive, Anaheim, Calif. 92805. Both righthand rotation (free flight) and lefthand (control line) versions are offered, in addition to various parts and accessories.

Of Pirelli and Superfine: The on-again, off-again rumor that Pirelli would no longer be produced turned out to be true. Filati was supposed to be the same as Pirelli but isn't. FAI Supply and Frank Zaic lost a bundle on



Modified version of 1973 Cox Tee Dee 049 by Kirm-Kraft features fine-thread needle valve.

it. According to Frank, we'll probably see American-made T-56 rubber back on the market. Meanwhile, tie knots, don't overwind, and pray a lot.

Frank recently uncovered some genuine prewar superfine tissue, both handmade and machined varieties. He is selling 20-sheet assortments for \$5 plus 50 cents postage. F. Zaic, Box 135, Northridge, Calif. 91324. Supply is limited.



## EAST COAST SOARING SOCIETY

For additional information, a free copy of the ECSS Journal, 'SAIL-PLANE', and an application blank, forward your request to: Clive Sadler, ECSS Sec., 46 Oakcrest Drive, Dover, DE 19901.



Editor:  
Carl Wheeley

# MODEL AVIATION

Official magazine

# A.M.A. NEWS



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## Aero-Crafts '74 in Philadelphia

### Museum to Show Modeling as an Art Form

Focus on January 31, 1974. That's the final date for Aero-Crafts '74 entry forms to be received by the Museum of the Philadelphia Civic Center, which is host and co-sponsor with the Academy of Model Aeronautics. The show, itself, runs from March 23 to April 18, 1974.

All types of model aircraft may be exhibited: Radio Control, Control Line, Free Flight, Scale. RC boats and cars also will be displayed. Altogether there will be close to 100 prize categories, and in addition AMA will be presenting achievement certificates down to 10th place in all categories—almost a

case of something for everyone. See accompanying chart for prize categories, types of models eligible for each, and a list of prize sponsors to date.

For entry forms, write to: Aero-Crafts '74, The Museum of the Philadelphia Civic Center, 34th and Civic Center Blvd., Philadelphia, Pa. 19104.

Entry in the Aero-Crafts '74 show-contest is open to any member of the AMA or the Model Aeronautics Assn. of Canada (MAAC) either in person or by proxy—through another modeler close enough to be able to deliver the entry on March 2 or 3 and pick it up following the show on April 20 or 21. There is no entry fee.

The head curator of the museum, Robert Nobel, said that he hoped to have enough en-

tries to fill the museum's 25,000 square feet of display area, but that space would be adjusted to fit the actual number of entries. He added that all entries will be fully insured and displayed completely away from physical contact by the viewing public—in the same manner as all standard museum exhibits. The museum's professional staff, aided by Philadelphia area model clubs, will prepare entries for exhibition. All works submitted are subject to the action of the jury for prizes and inclusion in the exhibit.

The museum is anxious to present modeling as an art form and as proof that craftsmanship is alive and flourishing. For modelers, a more important aspect of the show is the public exposure of our activity which, in such a setting and with the expected attendant



John Pierron, executive director of the Philadelphia Civic Center, and Lolly Pannella, above, examine the Civic Center Museum's trophy for Most Outstanding Craftsmanship in Aero-Crafts '74. The trophy is from the Cheslock Design Studios, chosen by the museum staff as particularly fitting for craftsmanship. Left: Edward Healy, Jr., regional vice-president of Industrial Valley Bank, and Susan Mattia are seen with the IVB award for the Largest Aircraft category. The show-contest takes place at the Museum of the Philadelphia Civic Center, March 23 through April 19, 1974.



## AERO-CRAFTS '74

### Museum of the Philadelphia Civic Center

PRIZE CATEGORY	ELIGIBLE MODEL TYPES					Prize Sponsor	PRIZE CATEGORY	ELIGIBLE MODEL TYPES					Prize Sponsor
	RC Airplane	Boat	Car	Control Line	Free Flight			RC Airplane	Boat	Car	Control Line	Free Flight	
Largest	●	●	●	●	●		WW II	●	●		●	●	
Smallest	●	●	●	●	●		Post WW II	●	●	●	●	●	Commandant, 4th Naval District
Pattern (Stunt)	●			●			Overall Best Scale	●	●	●	●	●	
Sport	●	●	●	●	●	Anne Lemmon, Central Bucks Aero	Antique Ship to 1900		●				Philadelphia Maritime Museum
Soaring	●				●		Seaplane or Amphibian	●				●	The Franklin Institute
Sail		●					Oldtimer	●				●	Perelman Antique Toy Museum
Steam		●					Best Fokker of Any Year	●			●	●	KLM Royal Dutch Airlines
Most Unusual	●	●	●	●	●	Camp Solo, Bangor, Maine	Largest Aircraft	●			●	●	Industrial Valley Bank, Philadelphia
Most Outstanding as Picked by Public	●	●	●	●	●		Best Navy or Marine Aircraft Any Year	●			●	●	Naval Aviation Museum, Pensacola
Best Finish	●	●	●	●	●		Best Sport RC Plane	●					Sterling Models
Best Speed Model	●	●	●	●			Best Sport CL Plane				●		Sullivan Products
Helicopter	●				●	Plasecki Aircraft Corporation	Best Model Pitts Special as Done in U.S. Aerobatic Team Colors	●			●	●	Ransome Airlines
Pre WW I	●			●	●		Best TWA from Tri-Motor to Tri-Star	●			●	●	Trans World Airlines
WW I	●			●	●		Most Outstanding Craftsmanship	●	●	●	●	●	Philadelphia Civic Center Museum
Between Wars	●	●	●	●	●		Best Lufthansa Aircraft 1924-1974	●			●	●	Lufthansa German Airlines
Notes: For entries in the Scale categories, the standard AMA rules apply for Proof of Scale. The award of the prize by sponsor indicated will go to one of the model types eligible for entry in each category. Prizes and/or certificates will be awarded in all classes and categories, and sponsors of prizes will be announced as soon as possible.													

publicity, will be one more step in helping to squash that tired old image of models only being 'toys for boys'. But it takes participation to make all these things 'tick', and so it is hoped that many AMA members will enter. Remember that the display and competition are completely static; models do not need to have been flown. This is an excellent opportunity for 'builders' to shine, whereas piloting and flight is a big factor in most AMA competitions. The show is timed to coincide with the usual completion of winter building projects but too early for much outdoor flying activity to have begun.

A blue ribbon panel of judges, headed by Paul Garber, will determine the winning models exhibited in Aero-Crafts '74. For many years Garber was curator of the Smithsonian Institution's National Air and Space Museum in Washington, D.C. Though presently retired, the museum bestowed upon him the title of curator emeritus.

The Museum of the Philadelphia Civic Center plans a multi-faceted program of promoting Aero-Crafts '74 which began in April 1973 with the distribution of special posters to AMA chartered clubs. Other plans include the participation of the Philadelphia Police Athletic League which will be running Delta



Dart contests for area youngsters in Convention Hall, adjacent to the museum, with kits provided by CBS Television Station WCAU-TV. Broad newspaper and television coverage is expected in connection with many planned occasions involving dignitaries. AMA PR Director Bob Lopshire, who arranged the details for the museum to be host to Aero-Crafts '74, will be working in the area to further promote the event.

All in all, Aero-Crafts '74 should be quite a show. If at all possible, plan to enter a model; if not and if you will be in the area during the period of the exhibit, March 23 to April 18, 1974, be sure to look in on the museum at 34th Street and Civic Center Blvd., Philadelphia, Pa.

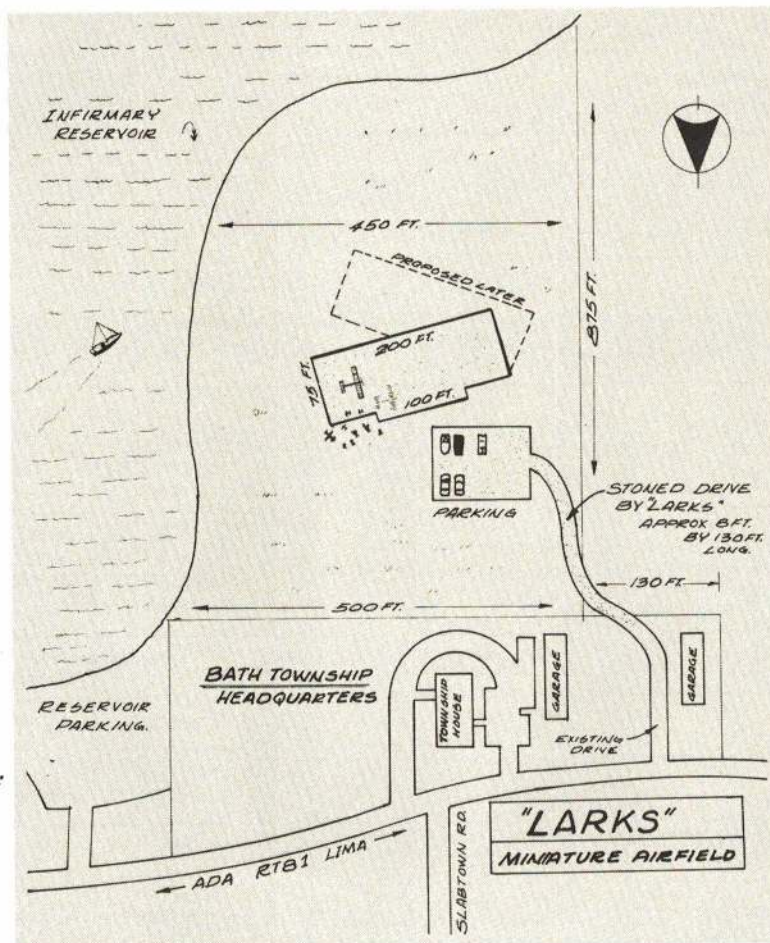
**KLM Royal Dutch Airlines Trophy will go to the Aero-Crafts '74 entrant who best duplicates a Fokker aircraft of any year.**



# THE LIMA AREA RADIO KONTROL

## SOCIETY STORY

By Joseph H. Nichols  
Sec./Treas., LARKS



How One AMA Chartered Club  
in Ohio Solved Its  
Flying Site Problem



LARKS officers confer on plans for dedication of the club's new RC flying field.  
L-R: Secretary-Treasurer Joseph Nichols, President David Baum, Activities Chair-  
man James Lasik. Stick-to-it-nivness pays off!

I am pleased to report that the LARKS have received authorization from the commissioners of Allen County, Ohio, to develop and use a tract of county-owned land, in excess of nine acres, for a permanent club flying site. I will outline the procedures we followed in the hope that they will help other clubs with flying site problems.

On February 6, 1973, we drafted a letter to the Board of Commissioners briefly stating our objectives and intentions. We outlined our purposes, affiliation with AMA, and requested assistance in obtaining necessary ground for a club flying site. Along with this letter we enclosed the "Greater Than Golf" reprint from National AEROnautics Magazine (distributed by AMA), our own PR sheet which "sells" the sport and ourselves, and a copy of our ground and flying rules.

Several weeks passed with no acknowledgement. Our president made a personal contact with the commissioners' office where he found that our letter and materials had been reviewed, and our request was placed on the agenda for the next commissioners' meeting.

Prior to this meeting our president paid a visit to the Allen County sanitation engineer, a personal friend, to obtain plot maps of available county-owned land. The county engineer took an interest and offered to attend the meeting and assist in our problem in our presentation.

At the commissioners' meeting we made our formal presentation and request for use of county-owned land. Our main interest at this point was selling the commissioners on our hobby. They were very cooperative and interested, especially in the area of youth involvement with the hobby. Several sites were discussed at length before coming to a unanimous agreement on one particular location. We rejected sites involved with our Parks Commission as this is a fairly new branch of county activity, and they were having their own problems getting organized.

The commissioners were quite impressed with our organization in that we are incorporated, hold a corporate FCC license, are affiliated with AMA, carried liability protection, and had imposed our own muffler ordinance. The AMA liability protection for our club and club members was a prime factor. The commissioners gave verbal approval for the land use, pending approval from the county prosecutor and township trustees as to easement and use of the land.

A few days passed, and one of our officers requested that our proposal be put on the agenda of the Trustees' Township Meeting. Our president and our field coordinator were accompanied by the Allen County sanitation engineer to this meeting where our objectives and intent were presented. The trustees and their legal counsel asked many questions concerning liability, noise, maintenance, easement and zoning ordinances. Following all of this, the trustees gave their approval, pending a check of zoning ordinances.

Shortly thereafter we received word that we would be in no violation of zoning. The

(Continued on page 114)



# AMA Loves Trade Shows—Trade Shows Love AMA!

## PRESIDENT'S MEMO

In the hobbycraft field there are a bunch of fine trade shows. Among them are the HIAA, TOLEDO, WRAMS, and MACS Shows. Each trade show has its own unique approach to the same problem, that of getting a consumer and a supplier together.

The Academy of Model Aeronautics just attended the MACS Show in Anaheim in Southern California. I'd like to report a bit on the impact of this kind of promotion.

The MACS (Model and Crafts Show), which is one of the biggest, is held in the spacious, plush, and beautiful Anaheim Convention Center. That is just across the street from Disneyland, and right in the middle of a lot of fine hotels, motels and restaurants. The MACS Show is sponsored jointly by the Orange Coast Radio Control Club and the Southern California Hobby Industry Association. The show was pretty obviously under the direction of five key guys, each wearing identical natty red jackets for easy identification. The Show Committee was made up of Don Patton, Bruce Patton, Lou Kolbo, Si Cohen and Dick Barnard. Realizing the importance of communications, an Information Center booth had been set up in the exact center of the show—with telephones, paging and announcing equipment, location charts, and at least two of the red-jacketed Show Committee gentlemen in attendance at all times. And no matter what problems came up, they never "blew their cool."

I could probably write nearly a "paperback" on the MACS Show, but as my space is limited I shall capsule my views into just bare-bones observations.

The MACS management team held 18 planning meetings \*\* About 2,100 hours of work went into the show \*\* 205 exhibitors thought this was a fine time and place to show their wares to a concentration of potential customers \*\* The previous year's show had drawn over 24,000 paid admissions to visit with the exhibitors and admire the



AMA President John Clemens (R) points out interesting detail to Dist. VI VP Glenn Lee. Photo from February Washington meeting.

exciting products \*\* The MACS Show originally was a model show only. Handicrafts were added to better represent the hobby dealer and to keep mom and the girls from getting bored. This proved to be a master move, making the show much bigger and better rounded, and giving it a beautiful TOGETHERNESS, family-look and result.

The Show Committee invited me to rest for a little while in the Show Manager's office which is upstairs, overlooking the entire building. There was just so much to see on the display floor that not one person bothered to look up to where I was sitting in a lighted window! From this vantage point I was impressed by several things \*\* The crowd was extremely orderly and polite \*\* I was really surprised at the great number of women who attended, but especially even more surprised by the number of youngsters present \*\* But I guess I was most impressed by how "sane" all these people looked!

Model related products were shown in

commercial booths along several aisles on one side of the exhibit hall, and handicraft booths lined several aisles on the other side. The center aisles of the hall had display tables covered with hundreds of consumer's finished products in both model and craft work. These had been turned in for both display and to compete for first, second and third place awards in 48 separate categories. A lot of hobbyists went home mighty proud! Mixed into all this excitement were model planes, gliders, ducted-fan models, airships, sailing ships, ocean liners, military models, railroad models, gasoline, electric and steam power devices, indoor and outdoor live demonstrations, and even a boat basin. And I gotta mention that overhead, every so often, was actually flown a helium-filled, electric-powered, RC blimp!

Among the most appreciated features of the MACS Show were a couple of things that seldom get mentioned in write-ups. The concession food was very good, with tables so you could eat and rest; the restrooms were clean and comfortable, with "plenty of paper and towels!" AMEN!

Now, how is the Academy of Model Aeronautics connected with all this? The Academy is the world's largest consumer group in the hobbycraft field. Realizing the importance of this, the MACS Show management provided much appreciated space for an AMA booth right at the front door. The AMA booth was proudly handled by a bunch of District X's most devoted members. The relationship between AMA and all the trade shows is excellent in both directions. Here's THANKS to the MACS!

In conjunction with the MACS Show a District X AMA meeting was held so that the AMA membership could meet and talk with AMA's officers. Meetings like this assure AMA of being more truly a membership-controlled organization.

John E. Clemens  
AMA President

AMA at Toledo, below. Booth being manned by HQ staffers Danny Harrah, Earl Denny and Frank Ehling, plus Bill Harris, second from left. AMA at WRAMS, right, showing Lillian Worth, wife of the AMA executive director, passing out literature.





## LARKS Story (Cont.)

county engineer then took our proposal to the county prosecutor who swiftly reviewed and approved it.

Once we cleared these hurdles we were again put on the agenda of the Board of Commissioners. During the days preceding this meeting our officers had several unofficial meetings with the county sanitation engineer—who by this time was quite an asset—to work out all details as to layout, improvements and legal documents.

We again attended the meeting of the Board of Commissioners and made our detailed proposal. Copies of our articles of incorporation, AMA charter, AMA liability protection, and our self-policing rules were presented for the record at this time. Following a brief discussion the board voted to unanimously pass a resolution giving the LARKS the use of nine acres-plus of land, at no cost, to develop a permanent miniature RC airfield for private use of the members.

On April 17 I received a letter and the legal brief from the Board of Commissioners officially recording the resolution which contains the following 'common sense' conditions.

1. The members of the society are responsible for maintenance.
2. Necessary corporation and insurance papers be filed with the board.
3. The society save the county harmless from any legal action.
4. The society file a roster of current officers.
5. Construction be approved by the board.
6. Access to the ground be limited to a private drive.
7. No fund-raising events be associated with the use of the land (this excludes contests).



The advice provided by Allen County Sanitation Engineer Robert Tschanz, left, was significant in the quest by the LARKS for a flying field on county-owned land. Tschanz and LARKS President David Baum are shown reviewing points of a legal brief prepared for presentation to county officials.

After many, many failures in the club's history this is a feat of an indescribable magnitude. We have found that patience, perseverance and constant contact with the local government officials is necessary to achieve results. To achieve success any club must 'learn to play the game', adhere to protocol, follow the 'red tape' procedures, and keep on top of it.

All-in-all we found the local government

## Special CL Rulings Effective Immediately

### Scale Racing

Effective immediately it is required that the engine of each Control Line Scale Racer be completely stopped for refueling. This special ruling has been approved by the AMA president and the chairman of the CL Contest Board; it has been ratified by mail vote of the CLCB in accordance with current procedures for instituting competition rules quicker than the normal rules-change cycle.

The ruling was instituted for reasons of safety and also to be consistent with the CL Rat Racing rules. While no known problem has resulted from failure of the rules to require Scale Racing engines to be stopped, the new ruling was considered (and passed) because it was known that one or more modelers were contemplating the possibility of making pit stops with idled engines. This raised the potential of a very real safety problem to pit crews should the practice be successful and become common practice.

### Navy Carrier

Effective immediately, rule 21.3.3.1 concerning Profile Carrier Control Line models is changed to read as follows. "In the Profile Carrier class the term 'production RC-type intake throttle' means: the plain bearing engine will be acceptable if it and its single barrel intake throttle are factory produced units and they are advertised and sold as a completely factory assembled ready-to-run combination. Use of any homemade or custom produced throttle, dual carb set-ups, or combinations of engines and throttles except as defined above, are unacceptable. The intake throttle may be coupled to a corresponding factory installed exhaust throttle if the engine is sold with one, but this may be removed if desired. Responsibility for verifying that the engine and throttle conform to the above description rests with the contestant."

Similar approvals and ratifications have been accomplished as reported for the special Scale Racing ruling.

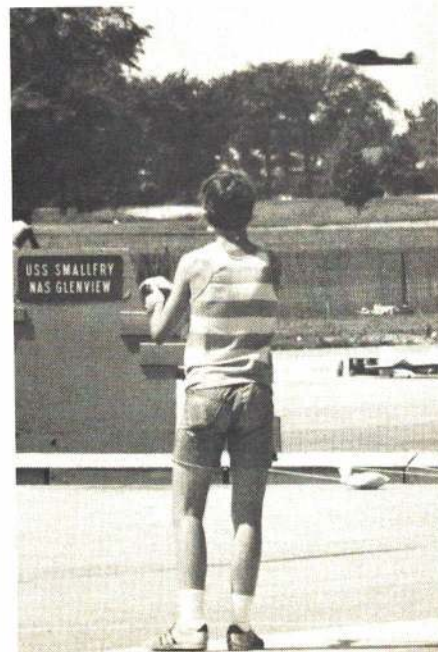
The revised Profile Carrier rule was considered (and passed) because one engine currently being produced is sold as a ready-to-run unit with a throttle of another manufacturer's make, technically in violation of the letter of the rules, but in complete conformity with the condition that the engine be advertised and sold as a factory produced ready-to-run unit. The obvious ambiguity was the reason for instituting the special ruling with immediate effectivity.

officials very cooperative and interested in our hobby. We hope that other clubs may make use of our experiences in gaining the solution to their flying site problems.

The preceding may seem lengthy and involved, but told are only the important highlights. There were many small details, some obvious, that had to be contended with. Once a club decides to take this route to obtain a field, our advice is: "Don't give up!"



Control Line Scale Racing and Navy Carrier are the subjects of two special competition rulings which are effective immediately. The engines of Scale Racers must be completely stopped for refueling. The new rule for engines of Profile Carrier models eliminates an ambiguity which previously existed, places emphasis on "off-the-shelf" engines.





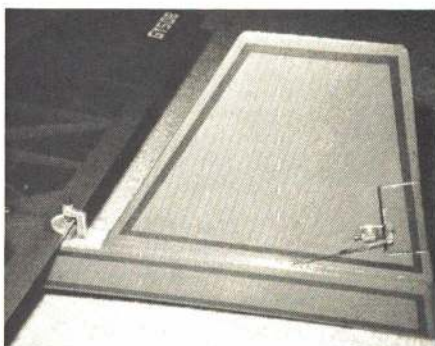
# record reviews

**FF Gas national AMA record, category I, Open age class: 53 minutes, 8 seconds, established by John C. Warren (AMA 39065), Newport Beach, Calif., on April 15, 1973.**



Warren's model was the Gysob as designed by Ed Bellinger (AMA 19071) but modified for variable incidence stabilizer and rudder with these functions controlled by a Selig timer. Power came from an HP 40 R-PR engine with K&B long plug and Rev-up prop of 10" diameter and 4" pitch. The only reported engine modification was to increase the compression ratio. The engine was run with home-mixed fuel carried in a Perfect fuel tank.

The MonoKoted airplane has a wing of 83" span and 11.5" center chord, while the stab is 35" by 8". The airfoils of both the wing and stab are 9% thickness. The overall fuselage length is 72", and the model weighed 59 ozs.



**CL Endrance national AMA record, Junior age class: 42 minutes, 45.9 seconds, established by Skip Towe (AMA 69734), Columbia, S.C., on May 5, 1973.**



The record setting model was the Magician built from a Midwest Products Co. kit but modified to include a fuel tank cover for AMA rule compliance. The airplane weighed 3 lbs., 3.5 ozs., complete with fuel.

Power came from a Veco .35 engine equipped with a Fox glow plug, 10"D x 6"P Pro-Line wood prop and Pylon Brand No. SS-12 clunk tank which carried Fox Super-fuel. The model used K&B wheels, Perfect large bellcrank and lead-outs, E-Z-Just control handle, and AeroGloss dope finish. Photo by Michael F. Schumpert.

**FF Gas national AMA record, category I, Open age class: 39 minutes, 19 seconds, established by Bruce Hannah (AMA 47438), Rancho Cordova, Calif., on May 28, 1973;**



Hannah's original design model is named Easy 450. It has a 54" wing span and 8.2" chord, 22" stab span and 6.2" chord. He chose a flat bottom airfoil of 8% thickness for the wing and 7% for the stabilizer—the high point of each being at 35% of chord. The fuselage utilizes a fiberglass fishing pole blank rear section and a streamlined "pod" front end onto which is a Tatone FAI Mount. The model weighed 19 ounces.

A Supertigre .23 in conjunction with a Cox grey 8"D x 4"P prop gave the airplane its "go". The engine used a Fireball glow plug and K&B Supersonic 1000 fuel, the latter carried in a Perfect tank. A Tatone flood-off timer was used for controlling both the engine run and an auto-rudder. Sig fuse operated the dethermalizer. The model was covered with Sig Jap tissue and finished with AeroGloss dope. The record was established during the 1973 U.S. Free Flight Championships at Taft, Calif. Photo by Bruce Aldrich.

## New RC Frequencies?

Very likely. The Federal Communications Commission is currently proposing to open up the frequency range of 220 to 225 MHz as a new Citizens Radio Service. Much exploration of frequency allocations, enforcement problems and many other details remain to be determined, but the significant point is that the FCC, itself, is proposing the service, and thus it seems that having it become a reality is only a matter of time.

AMA was already involved soon after release of the FCC proposal in considering rec-

ommendations to be submitted by the deadline of September 20, 1973. AMA's Frequency Committee and legal counsel were studying possibilities when this was written.

A possible side benefit of the FCC proposal is that the 27 MHz frequencies may become less populated when the new service opens up. There is expected to be a major transfer of activity due to the desire of many current communications interests to get away from the crowded and undisciplined Class D Citizens Band voice operations.

Those interested in learning more should request copies of FCC Docket 19759, released June 12, 1973. Write to: Federal Communications Commission, Washington, D.C. 20554.



**FF Unlimited Rubber national AMA record category I, Junior age class: 22 minutes, 54 seconds, established by Jim Johnson (AMA 75784), Rancho Cordova, Calif. on May 31, 1971.**



The airframe weight of Jim's record setter is 2.5 ounces, and the eight 38" length strands of 3/16" Sig rubber weighed another ounce. The prop, 14" diameter by 19" pitch, is of the free-wheeling type and was finished from a machine-cut blank.

The airplane is a design by Ernst Johnson and is named "Super Arrow". Its wing has a span of 38" and center chord of 5", while the stabilizer is 17" by 3-3/8". Flight surfaces were covered with Sig Jap tissue and finished with clear dope. The fuselage of 40" length is a sheet of 3/8" balsa which is tapered and streamlined. As readily can be seen in the photo, the rubber motor is suspended beneath the fuselage. The wing mount is an open wire frame which permits fore and aft adjustment for balance. Dethermalizing is by means of Sig fuse which severs the front frame hold-down at the fuselage, permitting the front of the wing (and the wing holding frame) to pop up at a 60-degree angle. Additional description of this model was provided by Bob Meuser in the October 1971 American Aircraft Modeler.

**CL Endurance national AMA record, Junior age class: 22 minutes, 11 seconds, established by Jimmy Haslam (AMA 45873), Salt Lake City, Utah, on May 22, 1971.**

Fuel feed sensitivity to flight angle-of-attack is reported to be the cause of the engine quitting with a relatively short flight, though still a record setter. The airplane was carrying a quart of K & B 100 fuel (27 ozs. empty weight, 60 1/2 ozs. takeoff weight) which undoubtedly would have produced a much longer flight otherwise.

The craft was designed by James Rhoades and named "Turbulent Turtle II", though modified somewhat. Its wing of FF multi-spar

**Hobby Dealers—Clubs—Leaders: need AMA application blanks? For a free supply write to AMA HQ, 806 Fifteenth St., N.W., Washington, D.C. 20005. Specify how many are wanted.**

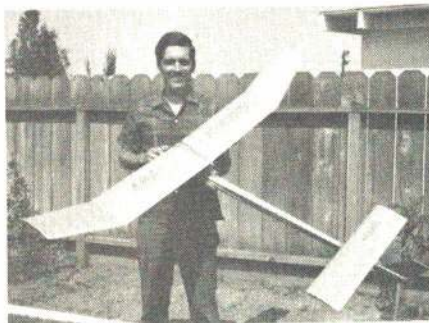
**Chartered Club officers who receive the AMA Monthly Mailing found out in August what was August's big modeling news. Did you? If not, ask your officers why not!**



construction has a span of 48" and chord of 10", with Sig Jap tissue covering and butyrate dope finish. The stabilizer is 22" by 3 1/2", and the overall fuselage length is 35".

Other products used: Enya .19 V T.V. engine, 9"D x 6"P Rev-Up prop, 3" Perfect bellcrank, Sullivan adjustable control handle, 3" Trexler wheels, DuBro nylon elevator horn, Perfect leadout cables.

**FF FAI Power national AMA record, Open age class: 28 minutes, 35 seconds, established by Walter Ghio (AMA 15325), Stockton, Calif., on May 29, 1971.**



Ghio's own design "Misfit Mk III" was flown for the first six of 10 flights making up this record. When a fuel tank leak caused the timer to malfunction, the remaining flights were completed with an earlier Mk II design.

The Mk III version is pictured. It has a wing of 64" span and 7-5/8" center chord to produce a projected area of 460 sq. ins. The airfoil is a modified B-8353b. The stabilizer is 23-1/8" by 5-3/4" to produce 133 sq. ins. area. The measure from the wing T.E. to the stab L.E. is 23-3/4". Balance point is at 70% of the wing chord.

Power for the 27 1/2 oz. model was supplied by a Supertigre .15 which used a Fireball cool plug and swung a Bartels 7 1/2"D x 3-3/4"P prop. It has a Van Nest engine mount, Seelig timer, tissue covering and Aero Gloss finish.

**CL Class B Proto Speed national AMA record, Senior age class: 142.57 m.p.h., established by Terry Herron (AMA 33006), Wichita, Kans., on June 6, 1971.**

Terry's original design has a wingspan of 31" and 4-5/16" chord. The airfoil is nearly symmetrical, with 51% of the camber on the top surface. The stabilizer is 10 1/2" by 2 1/4".



The fuselage, the bottom of which is a Harter Proto pan, has an overall length of 21". Sig bass and balsa were the primary construction materials, Hobby Pox was used in finishing, and an unusual feature is the landing gear made of titanium. All-up weight is 21.5 ounces. "Glickmort" is the name given by Terry to the airplane.

Power came from a Supertigre G21/29RV using a Fireball standard long plug, Rev-Up 8"D x 8"P prop, original fuel by Chuck Herron, and Bill's bladder for the fuel tank. Control was provided by an H & R torque unit and Speedmaster handle.

**Indoor FAI Stick national AMA record, AMA ceiling category II, Senior age class: 18 minutes, 41 seconds, established by Robert Dunham II (AMA 39311), Tulsa, Okla., on July 27, 1971.**

The .036 oz. model was designed by Robert's father. The wing is 25" in span, 3-7/8" in chord, and has a 6% arc airfoil. The stabilizer, 11" span and 3-3/8" center chord, has the same airfoil. Mounted above the motor stick on 2 1/2" posts, the wing is covered with Microdyne microfilm and braced with Dacron threads. The motor stick is 12" in length, while the tail boom, to the stab trailing edge, is 8 1/2". The prop has a diameter and pitch of 16" x 32", and power comes from two 15" strands of .055" x .041" Pirelli lubed with a mixture of green soap and glycerine. The airplane was constructed with balsa wood, glue and hardware all from Microdyne.

## AMA Officer Directory

The most recent complete directory was published in the August AAM, page 101. Since then several changes have occurred, as follows:

Secretary-Treasurer Earl Witt has a new address: R.R. No. 1, Box 309, Chambersburg, Pa. 17701.

District V. James Perdue, vice-president and general contest coordinator for the area, has moved. New address: Kingston Circle, RFD No. 4, Athens, Tenn. 37303. Bill Neighbors has been appointed to replace George Pickel as Dist. V Free Flight Contest Board representative. Address for Neighbors: 211 W. Newberry St., Chattanooga, Tenn. 37415.

District VI. A new associate vice-president has been named: Edwin Wynn Paul, 1640 Maywick Dr., Lexington, Ky. 40504.



# Contest Calendar

## Official Sanctioned Contests of the Academy of Model Aeronautics

SEPT. 1-2-ANDERSON, IND. (AA) Madison County 2nd Annual RC Contest. Site: Anderson Municipal Airport. D. Huffman CD, RR 3, Box 3508, Elwood, Ind. 46036. Sponsor: Madison County RC Flyers.

SEPT. 1-2-BILLINGS, MONT. (AA) 7th Annual Montana RC Championships. Site: Billings F/M Field, R. Wilson CD, 3225 Phillip, Billings, Mont. 59102. Sponsor: Billings Flying Mustangs.

SEPT. 1-2-SHOREVIEW, MINN. (A) 2nd Annual RC Pylon & Scale Meet. Site: St. Paul RC Field, D. Brushaber CD, 6925 Newton Ave., N. Minneapolis, Minn. 55430. Sponsor: St. Paul Radio Controllers.

SEPT. 1-2-PASADENA, TEX. 24th Annual Gulf Coast RC Fun Fly. Site: Red Barron Flying Field, W. Beckham CD, 806 Grove Ave., Deer Park, Tex. 77536. Sponsor: Gulf Coast RC Club.

SEPT. 1-3-PARKERSBURG, W.V. (AA) Vienna Sky Sharks Annual RC Contest. Site: Pettyville, S. Sturm CD, Box 5234, Vienna, W.V. 26105. Sponsor: Vienna Sky Sharks M.A.C., Inc.

SEPT. 1-3-MEMPHIS, TENN. (AA) Annual Memphis RC Meet. Site: Club Flying Site, J. Harris CD, 4791 Parkside Ave., Memphis, Tenn. 38117. Sponsor: Memphis RC Club.

SEPT. 1-3-JACKSONVILLE, FLA. (AAA) District Five FF (Cat. II), CL & RC Championships. Site: NAAS Whitehouse, C. Belcher CD, 5331 Redcar St., Jacksonville, Fla. 32209. Sponsor: Gateway RC Club, RC Club of Jacksonville, N. F. Fla. Team.

SEPT. 1-3-COUNCIL BLUFFS, IOWA (AA) Mid-America RC Soaring Society Thermal Open Meet. Site: Council Bluffs, M. Wilken CD, 36 Zenith Dr., Council Bluffs, Iowa 51501. Sponsor: Cobras RC Club.

SEPT. 1-3-UTAH, UT. (AAA) Fourteenth Annual FF (Cat. I) Model Air Show. Site: Saltair Model Port, F. Haslam CD, 3731 S. 5450 West, Salt Lake City, Utah 84120. Sponsor: Utah State Aeromodelers, Inc.

SEPT. 1-3-ALBUQUERQUE, N.M. FAI FF Semi-Finals. Site: Boy's Academy, H. Ryerson CD, 4004 Donald Rd., SW, Albuquerque, N.M. 87105. Sponsor: South West Aero Team.

SEPT. 1-3-BRIGHTON, WISC. North-Central Area FAI FF Semi-Finals. Site: Bong Field, P. Sotich CD, W. 62nd Pl., Chicago, Ill. 60629. Sponsor: Chicago Aeromodelers & Illinois Model Aero Club.

SEPT. 1-3-ANNVILLE, PENNA. Labor Day Fly for Fun. Site: Indiantown Gap, P. Schroepe, Jr. CD, 3726 N. 4th St., Harrisburg, Penna. 17110. Sponsor: Keystone RC Society.

SEPT. 2-MANSFIELD, OHIO (AA) Electronic Flyers RC Pattern Contest. Site: Mt. Zion Road, M. Kalish CD, 235 Cline Ave., Mansfield, Ohio 44907. Sponsor: Electronic Flyers.

SEPT. 2-COLUMBUS, OHIO (AA) 8th Annual Capital City Controllers CL Meet. Site: Lockbourne A.F.B.-Tentative, J. Everett CD, 4661 Larkhall Ln., Columbus, Ohio 43229. Sponsor: Capital City Controllers.

SEPT. 2-GLENVIEW, ILL. (AA) Chicago Scalemasters "5" PM CL, FF & RC Meet. Site: Glenview N.S. T. Inglesby CD, 7613 W. Fullerton Ave., Glenview Park, Ill. 60035. Sponsor: Chicago Scalemasters.

SEPT. 2-FRAMINGHAM, MASS. Fun Fly. Site: Callahan State Park, B. Fish CD, 17 Salmi Rd., Framingham, Mass. 01701. Sponsor: Charles River Radio Controllers.

SEPT. 7-9-FALLS ON ROUGH, KY. (A) Quarter-Midget RC Nationals. Site: Rough River State Park, Cooper CD, 1700 Lynn Way, Louisville, Ky. 40222.

SEPT. 8-9-TAFT, CALIF. (AA) Thunderbugs 27th Annual FF (Cat. I) Meet. Site: Taft, J. Bonang CD, 11620-A Freeman, Hawthorne, Calif. 90250. Sponsor: Thunderbugs.

SEPT. 8-9-WACO, TEX. 5th Annual HOT M.A.C. RC Meet. Site: Waco, C. Horton CD, 916 Wedgewood, Waco, Tex. 76710. Sponsor: H.O.T. M.A.C.

SEPT. 8-9-FT. WAYNE, IND. (AA) 20th Annual Mid-States RC Contest. Site: Smith Field Airport, P. Gieseking CD, 1212 Delta Blvd., Ft. Wayne, Ind. 46805. Sponsor: Fort Wayne Flying Circuits.

SEPT. 8-9-RALEIGH, N.C. (A) RD/RC Sept. Pattern RC Meet. Site: Raleigh, W. Franklin CD, Rt. 6, Box 189, Durham, N.C. 27703. Sponsor: RD/RC.

SEPT. 8-9-RHINEBECK, N.Y. (A) Rhinebeck WW I Annual Jamboree. Site: Rhinebeck, G. Bickel CD, Rt. No. 52, Hopewell, N.Y. 12533. Sponsor: Mid-Hudson Radio Control Society, Inc.

SEPT. 8-9-FISKDALE, MASS. Annual Hydro Championships. Site: Brimfield Dam, W. Army CD, 15 Rhodes St., Milbury, Mass. 01527. Sponsor: New England RC Modelers.

SEPT. 9-MIAMIA, FLA. FMRA F1 RC Meet. Site: Tamia Amia Field, M. Holland CD, 1201 Willowbrook Tr., Maitland, Fla. 32751. Sponsor: R.C.A.C.F.

SEPT. 9-DAYTON, OHIO (AA) O.P.R.A. RC Championships. Site: Dayton, W. Hager CD, 5200 Rye Dr., Dayton, Ohio 45424. Sponsor: Dayton Wing Masters.

SEPT. 9-WAUKEGAN, ILL. (A) Prop & Wing Annual CL Meet. Site: 2303 Grand Ave., J. Fruit CD, 2258 Heathercliff, Libertyville, Ill. 60048. Sponsor: Prop & Wing Model Airplane Club.

SEPT. 9-SHARON, PENNA. Skylarks Fun Fly & Demonstration. Site: Skylarks

Field, P. Fliner CD, 444 S. Crescent Dr., Sharon, Penna. 16146. Sponsor: Skylarks of Sharon, Penna.

SEPT. 9-BRIGHTON, WISC. (AA) 30th Annual Midwestern States FF Championships. Site: Bong Field, P. Sotich CD, 3851 W. 62nd Pl., Chicago, Ill. 60629. Sponsor: Chicago Aeromodelers.

SEPT. 9-DODGE CITY, KANS. (A) Continental Pattern Meet for RC & CL Continental Patterns. Site: St. Marys Campus, D. Stevens CD, 908 Texas Trail, Dodge City, Kans. 67801. Sponsor: Hi-Plains RC Club.

SEPT. 9-AURORA, COLO. (AA) Colorado Fall CL Festival. Site: Spring Hill Golf Course, J. Wood, Jr. CD, 6841 Pomona Dr., Arvada, Colo. 80003. Sponsor: Colorado Air Tragedy Society.

SEPT. 9-OVERLAND PARK, KANS. (AA) Aeromodelers Autumn CL Meet. Site: Johnson County Community College, S. Johnston CD, 10122 W. 96th Tr., Overland Park, Kans. 66212. Sponsor: Johnson County Aeromodelers.

SEPT. 9-UNION, N.J. (AAA) 19th Union Model Airplane CL Invitational. Site: Morrison Field, W. Stauch CD, 158 Washington Ave., Elizabeth, N.J. 07202.

SEPT. 9-ORWELL, OHIO (AA) 1st Annual FF Spring Thing. Site: Champion Field, J. Peters CD, 315 Bradford Rd., Canfield, Ohio 44406. Sponsor: Ohio Flying Aces.

SEPT. 9-TRUMBULL, CONN. (A) Thermal Soaring RC Meet. Site: Trumbull, W. Wargo CD, Sport Hill Rd., Redding, Conn. 06896. Sponsor: RC Club of Connecticut.

SEPT. 9-10-DAYTON, OHIO (AAA) Dayton Buzzin Buzzards CL Jamboree. Site: Municipal Flying Circles, R. Hoeber CD, 337 Murchison Ln., Dayton, Ohio 45431. Sponsor: Dayton Buzzin Buzzards.

SEPT. 15-16-ELMIRA, N.Y. (A) Harris Hill Open RC Model Glider Meet. Site: Harris Hill, E. Heyworth CD, 1210 Wolcott Dr., Horseheads, N.Y. 14845. Sponsor: Flying Sparks of Elmira, N.Y.

SEPT. 15-16-W. SUFFIELD, CT. (A) Nor'East RC Air Races. Site: W. Suffield, B. Williams CD, 347 Southwick Rd., Westfield, Ma. 01085. Sponsor: Northern Connecticut RC Club.

SEPT. 15-16-FRESNO, CALIF. (A) North-South O.T. Meet (Cat. II). Site: Fresno, R. Douglas CD, 5303 Calderwood Ln., San Jose, Calif. 95118. Sponsor: Oakland Cloud Dusters.

SEPT. 15-16-MONROE, N.C. (A) MR/CC RC Air Races. Site: Monroe, B. Helms CD, 800 Tyvola Pk., Charlotte, N.C. 28210. Sponsor: Monroe RC Club.

SEPT. 15-16-BOSSIER CITY, LA. (A) Sharks Annual 1973 RC Meet. Site: Sharks International, J. Monk CD, 574 Janet Ln., Shreveport, La. 71108. Sponsor: Shreveport Area Radio Controllers.

SEPT. 15-16-WYANDOTTE, MICH. Indian City Open RC Fun Fly. Site: Wyandotte, E. Lynn CD, 3167-22nd, Wyandotte, Mich. 48192. Sponsor: Indian City RC.

SEPT. 15-16-TUCSON, ARIZ. (AA) Cholla Choppers MAC Fall CL Invitational. Site: Rodeo Park, F. Townsend CD, 2751 N. Campbell Ave., Tucson, Ariz. 85719. Sponsor: Cholla Choppers M.A.C.

SEPT. 15-16-S. EL MONTE, CALIF. San Gabriel Valley Air Circus. Site: Whittier Narrows, J. Garabedian CD, 909 N. 3rd St., Montebello, Calif. 90640. Sponsor: San Gabriel Valley RC Club.

SEPT. 15-16-JACKSON, MISS. (AA) Miss. State RC Championships. Site: Jackson RC Field, B. Payne CD, 378 Naples Rd., Jackson, Miss. 39206. Sponsor: Capitol City RC Club.

SEPT. 16-MAYWOOD, ILL. (A) RC Pylon Race. Site: Maywood, R. Plorek, CD, 823 N. Lombard, Oak Park, Ill. 60302. Sponsor: Checkerboard RC Club & Chicago Pylon Club.

SEPT. 16-BRIGHTON, WISC. (AA) 11th Chicago Aeromodels Fall Old Timers Contest (Cat. II). Site: Bong Field, P. Sotich CD, 3851 W. 62nd Pl., Chicago, Ill. 60629. Sponsor: Chicago Aeromodels.

SEPT. 16-DETROIT, MICH. (AA) Fall CL Internationals. Site: Rouge Park, J. Lucas CD, 20463 Ardmore, Detroit, Mich. 48235. Sponsor: Strathmore Model Club of Detroit.

SEPT. 16-WESTFIELD, IND. (A) Hamilton County Fly for Fun. Site: Westfield, H. Vandiver CD, 10714 Lakeview Dr., Carmel, Ind. 46032. Sponsor: Hamilton County Modelers.

SEPT. 16-CENTER VILLAGE, OHIO (A) 4th Annual CORKS RC Invitational. Site: CORKS Field, F. Johanson CD, 202 Patti Dr., Westerville, Ohio 43081. Sponsor: Columbus Ohio RK Society.

SEPT. 16-JOHNSTOWN, PENNA. (AAA) 26th Annual Eastern States FF, CL & RC Championships. Site: Warminster N.A.F. R. Leishman CD, 167 Goldenridge Dr., Levittown, Penna. 19057.

SEPT. 16-EVERETT, WASH. (A) Everett F1/G1 Flng. Site: Mariner H.S. R. Hesseline CD, 2223 Green Lantern Rd., Everett, Wash. 98201. Sponsor: Everett Line Kinkers.

SEPT. 16-WASHINGTON, D.C. (A) Summer Stunt & Control CL Contest. Site: Anacostia Naval Air Station, J. Greene CD, 5902 Cherrywood Ter., N. 101, Greenbelt, Md. 20770. Sponsor: Sky Lancers of Washington, D.C.

SEPT. 16-LEXINGTON, KY. (AAA) Mid-America CL Championships. Site: Kearner Field, L. McFarland CD, P.O. Box 8177, Lexington, Ky. 40503. Sponsor: Lexington M.A.C.

SEPT. 16-ALBANY, ORE. (A) 3rd Annual Northwest Old Timers Championships.

Site: Parker Field, J. Shafer CD, P.O. Box 322, Dallas, Ore. 97338. Sponsor: Willamette Modelers Club, Inc.

SEPT. 16-WICHITA, KANS. (A) Great Plains RC Pylon Racing Championships. Site: Wichita Model Council Field, D. Moden CD, 410 Hart, Salina, Kans. 67401. Sponsor: Wichita RC Club.

SEPT. 22-23-BUFFALO, N.Y. (AA) United Pylon Racing Circuit RC Championships. Site: Buffalo, H. deBolt CD, 49 Colden Ct., Buffalo, N.Y. 14225.

SEPT. 22-23-SOMERS, N.Y. Somers RC Post WW I RC Standoff Scale Meet. Site: Old Somers Airfield, C. Babin CD, Dawn Hill, Goldens Bridge, N.Y. 10526.

SEPT. 22-23-QUEENS, N.Y. (AAA) Assn. Model Airplane Clubs of Greater N.Y. CL Meet. Site: Flushing Meadow Park, J. Drosch, Jr. CD, 86-17 108th St., Richmond Hill, N.Y. 11418.

SEPT. 22-23-HUNTSVILLE, ALA. (AA) MACH FF (Cat. I) Meet. Site: Old Huntsville Airport, R. Deep CD, 8620 Valley View Dr., SE, Huntsville, Ala. 35802. Sponsor: Model Airplane Club of Huntsville.

SEPT. 22-23-MORGAN HILL, CALIF. (A) Western Front WW I RC Meet. Site: Hill Country Air Museum, M. Groves CD, 691 Nisqually Dr., Sunnyvale, Calif. 94087. Sponsor: Pioneer RC Club.

SEPT. 22-23-AMARILLO, TEX. (AA) ARKS 13th Annual RC Contest. Site: S.E. Park, B. Irwin CD, Rt. 2, Box 44A146, Amarillo, Tex. 79101. Sponsor: Amarillo RK Society.

SEPT. 23-GLASTONBURY, CONN. (AA) East Coast Old Timers FF (Cat. II) Championships. Site: pending, J. Whittles CD, 43 Farview Ave., Saybrook, Conn. 06475. Sponsor: Soc. of Antique Modelers, Chapter 7.

SEPT. 23-WARSZAW, IND. (A) 4th Annual RC Fun Fly. Site: Warsaw, R. Burne CD, 403 W. Winona Ave., Warsaw, Ind. 46580. Sponsor: Warsaw Aero Modelers.

SEPT. 23-LOUISVILLE, OHIO (A) Soaring RC Meet. Site: Louisville High School, J. Koontz CD, 3744 Grove Rd., NE, N. Canton, Ohio 44721.

SEPT. 23-FT. WORTH, TEX. (A) Formula I RC Pylon Race. Site: Thunderbird Field, O. Slaughter CD, 2202 Jacobs Ln., Ft. Worth, Tex. 36115.

SEPT. 23-LAKEHURST, N.J. (A) Burlington-Mercer Class A Pattern RC Meet. Site: Lakehurst N.A.S. H. Clark CD, 1130 Monmouth Rd., Mt. Holly, N.J. 08060. Sponsor: Burlington County RC Club & Mercer County RC Society.

SEPT. 23-SIMSBURY, CONN. (A) SRCC RC Soaring Meet. Site: Simsbury, E. More CD, 8 Wescott Rd., Simsbury, Conn. 06070. Sponsor: Simsbury RC Club.

SEPT. 23-RACINE, WISC. Racine RC Club RC Pylon Races. Site: Racine RC Field, D. Gauer CD, 832 C Colonial, Wheeling, Ill. 60090. Sponsor: Chicago Pylon Club.

SEPT. 23-OLIVILLE, VA. RARC Racing Events. Site: Oliville, J. Tyndall CD, 4902 Embassy Rd., Richmond, Va. 23230. Sponsor: Richmond Area RC Club, Inc.

SEPT. 23-SALEM, ILL. (A) McDonnell Douglas FF (Cat. II) Contest. Site: Salem-Leckrone Airport, J. Bennett CD, 324 Helfenstein Ave., St. Louis, Mo. 63119. Sponsor: McDonnell Douglas FF Club.

SEPT. 23-UTICA, MICH. (AA) Michigan State Outdoor Scale FF & CL Meet. Site: Utica Test Track, E. Stoll CD, 30471 Manse, Mt. Clemens, Mich. 48043. Sponsor: Detroit Balsa Bugs.

SEPT. 29-30-BALLSTONSPA, N.Y. (A) Empire State RC Racing Meet. Site: Saratoga County Airport, A. Sattler CD, 29 Waldorf Rd., Saratoga, N.Y. 12307. Sponsor: Thunderbolts RC Club, Inc.

SEPT. 29-30-COUNCIL BLUFFS, IOWA (AA) Cobras RC Pylon Meet. Site: Cobras Flying Field, J. Dreier CD, 1918 Avenue B, Council Bluffs, Iowa 51501. Sponsor: Cobras RC Club.

SEPT. 29-30-TRACY, CALIF. (A) Western State RC Pylon Championships. Site: Tracy Airport, G. Korpi CD, 1355 Danby Ave., San Jose, Calif. 95132. Sponsor: Pioneer RC Club.

SEPT. 29-30-FRESNO, CALIF. (AA) Randall's Roundup "Annual" 34th FF (Cat. I) Meet. Site: Ave. 12, R. Ginder, Jr. CD, 5740 Ashlan Ave., Fresno, Calif. 93727. Sponsor: Fresno Gas Model Club.

SEPT. 30-BRIDGewater, MASS. RC Fun Fly. Site: Bridgewater, S. Rizzotto CD, 36 N. Lillian St., Randolph, Mass. 02368. Sponsor: South Shore RC Club.

SEPT. 30-MESQUITE, TEX. (A) Third Annual A-B Pattern & Sport Scale RC Meet. Site: Samuels Park East, B. O'Steen CD, 1506 Marie Terr., Mesquite, Tex. Sponsor: Golden Triangle RC Club.

SEPT. 30-MESQUITE, TEX. (AA) 12th Annual Fall FF Bash. Site: Samuels East Park, E. Fedor CD, 1303 "C" Timberlake, Arlington, Tex. 76010. Sponsor: Cliff Cloud Climbers of Dallas.

SEPT. 30-MENTOR, OHIO Fifth Quarter Midget World Championships. Site: Tyler Blvd., R. Penko CD, 21151 Westport Ave., Euclid, Ohio 44123. Sponsor: Mentor Area RC Society.

SEPT. 30-ROCKAWAY, N.Y. (A) 1973 East Coast RC Scale Championships. Site: Riis Park, J. D'Amico CD, 9224 Rost Pl., Brooklyn, N.Y. 11236. Sponsor: Penn Avenue RC Society.

SEPT. 30-FAYETTEVILLE, ARK. (A) Fayetteville Aeromodelers Quarter Midget RC Meet. Site: Fayetteville Airport, R. Hall CD, 1830 Old Wire Rd., Fayetteville, Ark. 72701. Sponsor: Fayetteville Aeromodelers.

SEPT. 30-COLUMBUS, A.F.B., MISS. (AAA) 1st Annual J.O.C. RC & CL Model Airplane Contest. Site: Columbus A.F.B. J. Brownlee CD, 602 Park Circle Dr., Apt. 5,

Columbus, Miss. 39701. Sponsor: Columbus Prop Busters.

OCT. 6-7-CHICAGO, ILL. (AA) Chicago Pylon Club Midwest RC Championships. Site: SAC Field, A. Schwimmer CD, 340 N. Ridge Ave., Evanston, Ill. 60022. Sponsor: Chicago Pylon Club.

OCT. 6-7-SPOKANE, WASH. (A) October Fest RC Meet. Site: Spokane Polo Grounds, D. Carson CD, W. 329 Hoffman, Spokane, Wash. 99205. Sponsor: Aeronautic Radio Controllers of Spokane.

OCT. 6-7-DENVER, COLO. (AA) Great West Rocky Mountain 8th Annual FF (Cat. II) Championships. Site: E. Colfax Airport, G. Larrabee CD, 3203 W. Saratoga, Englewood, Colo. 80110. Sponsor: Magnificent Mountain Men.

OCT. 6-7-BEAUMONT, TEX. (AA) Beaumont Open RC Meet. Site: Beaumont, D. Still CD, 306 Orleans, Beaumont, Tex. 77701. Sponsor: Beaumont RC Club.

OCT. 6-7-SOMERS, N.Y. Golden Era RC Meet. Site: RC Club Field, L. Perretti CD, Juniper Dr., Lake Lincoln, N.Y. 10540.

OCT. 6-7-S. EL MONTE, CALIF. (A) San Gabriel Valley RC Pattern Meet. Site: Whittier Narrows, J. Garabedian CD, 909 N. 3rd St., Montebello, Calif. 90640. Sponsor: San Gabriel Valley RC Club.

OCT. 6-7-SAN LUIS OBISPO, CALIF. (A) R.C.M. RC Trophy Race. Site: S.L.O. Flyers Slope Site, L. Ledson CD, 1864 Lima Dr., San Luis Obispo, Calif. 93401. Sponsor: S.L.O. Flyers, Inc.

OCT. 7-SHAKOPEE, MINN. (B) 3rd Annual Minn. State RC Championships. Site: T.C.R.C. Field, D. Heywood CD, 6811 Elliot Ave., S., Minneapolis, Minn. 55423. Sponsor: Twin City RC's Inc.

OCT. 7-VAN NUYS, CALIF. (A) N.A.R. Flightmasters Annual FF Meet. Site: Sepulveda Basin, J. Kusik CD, 9172 Wilhelm Cir., Van Nuys, Calif. 92646. Sponsor: N.A.R. Flightmasters.

OCT. 7-BRISTOL, CONN. (AA) Mum Classic CL Meet. Site: Edgewood School, J. Scott, Jr. CD, 265 Witches Rock Rd., Bristol, Conn. 06010. Sponsor: Hornets Model Airplane Club.

OCT. 7-SOUTHFIELD, MICH. (A) Cloudbusters 15th Annual Scale FF & Indoor Meet. Site: 11 Mile & Franklin Rds., R. Kuenz CD, 14645 Stahelin, Detroit, Mich. 48223.

OCT. 7-ALLIANCE, OHIO (A) Alliance RC Speed Flight. Site: Barber Airport, G. Villard CD, 3301 23rd St., NW, Canton, Ohio 44709. Sponsor: Alliance Balsa Bees.

OCT. 7-LINCOLN, N.J. (A) 15th Annual CL Model Air Show. Site: Lincoln Park, K. Purzycki CD, 273 Marcella Rd., Parsippany, N.J. 07054. Sponsor: Garden State Circle Burners, Inc.

OCT. 7-LAKEHURST, N.J. (AA) 1973 Eastern States RC Championships. Site: Lakehurst N.A.S. L. Shumaker CD, 1114 Raritan Rd., Clark, N.J. 07066. Sponsor: Central Jersey RC Club.

OCT. 13-14-FOUNTAIN VALLEY, CALIF. (A) Valley Flyers RC Air Races. Site: Mile Square, C. Smith CD, 8509 Lennox Ave., Panorama City, Calif. 91402. Sponsor: San Fernando Valley RC Flyers.

OCT. 14-WASHINGTON, D.C. (A) 1st Annual Fall Quadrathlon. Site: Anacostia Naval Air Station, J. Greene CD, 5902 Cherrywood Ter., N. 101, Greenbelt, Md. 20770. Sponsor: Sky Lancers of Washington, D.C.

OCT. 14-GLASTONBURY, CONN. SAM-7 Old Timer Fall FF Rally. Site: Meadow Road, J. Whittles CD, 43 Farview Ave., Saybrook, Conn. 06475. Sponsor: Society of Antique Modelers Chapter 7.

OCT. 14-LINCOLN PARK, N.J. (AA) 15th Annual CL Model Air Show. Site: G.S.C.B. Club Field, L. Misk, N.J. 415 Clifton Blvd., Clifton, N.J. 07013. Sponsor: Garden State Circle Burners.

OCT. 14-CHAGRIN FALLS, OHIO (AA) 4th Annual Midwest All-Scale FF & Indoor Meet. Site: Savage Road, L. Reineid CD, 3301 Cindy Ln., Erie, Penna. 16506. Sponsor: Erie Model Aircraft Assn.

OCT. 20-21-ABILENE, TEX. (A) Abilene RC Annual Meet. Site: Sea Bee Park, R. Howard CD, Rt. 4, Box 120, Abilene, Tex. 79603. Sponsor: Abilene RC.

OCT. 20-21-SUMMERVILLE, S.C. Charleston RC Society Fun Fly. Site: Summerville, D. Martin CD, 4361 Helene Dr., Chas. Hgts., S.C. 29405. Sponsor: Charleston RC Society.

OCT. 20-21-LAKESIDE, CALIF. (AA) San Diego Drones RC Pattern Meet. Site: Lakeside, G. Lewis CD, 1624 Chiswick Ct., El Cajon, Calif. 92020. Sponsor: San Diego Drones, Inc.

OCT. 21-MAUI, HAWAII (H) Maui CL Air Show. Site: Puunene, Maui, Hawaii, F. Fuchsberger CD, 87-263 Helema St., Waianae, HI. 96792. Sponsor: Hawaii RC Club.

OCT. 21-SACRAMENTO, CALIF. (A) Thirteenth Annual Sacramento Old Timers Meet. Site: Sacramento, R. Douglas CD, 5303 Calderwood Ln., San Jose, Calif. 95118. Sponsor: Oakland Cloud Dusters.

OCT. 27-28-LAS VEGAS, NEV. (AA) Las Vegas RC Open Meet. Site: Las Vegas, B. Mearns CD, 5412 Holmby Ave., Las Vegas, Nev. 89102. Sponsor: LVRC, Inc.

OCT. 27-28-OKLAHOMA CITY, OKLA. Model Hobby Fair. Site: Fair grounds, R. Freeland, Jr. CD, 7308 N. Western, Oklahoma City, Okla. 73116.

OCT. 28-VALKARIA, FLA. FMRA FI RC Meet. Site: Valkaria, M. Holland CD, 120 Willowbrook Tr., Maitland, Fla. 32751. Sponsor: R.C.A.C.F.

OCT. 28-FRESNO, CALIF. (A) F.G.M.C. Monthly FF (Cat. II) Meet. Site: Ave. 12, Road 36%, F. Ginder, Jr. CD, 5740 Ashlan Ave., Fresno, Calif. 93727. Sponsor: Fresno Gas Model Club.

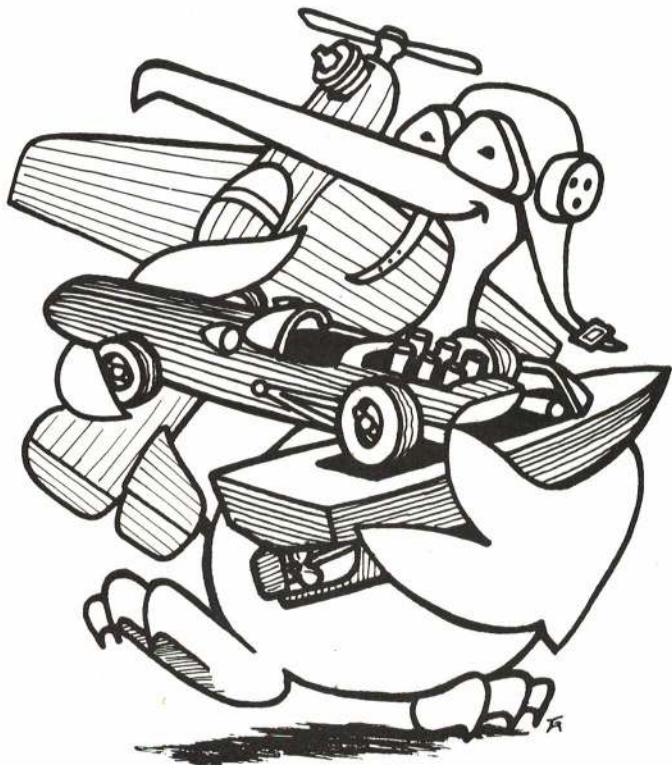
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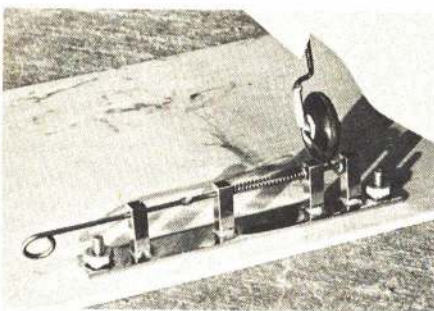
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## RABE ON CL

(Continued from page 26)



**E-Z-Just Handle Modification For Increased Line Spacing:** Occasionally I fly airplanes with elevators too small, or flaps too big and need some extra control movement to avoid shooting "touch and go" landings in the triangle bottoms. I feel insecure using the five-in. E-Z-Just and the other handles feel unnatural or weigh too much.



To get extra control movement with the small E-Z-Just, use a Moto-Tool to cut the plastic above the cable to a point on the top about a third of the way back. Then pull the cable up the slot until it is sticking out of the top of the handle. Now groove a piece of plywood to form a smooth contoured track for the cable and epoxy it to the top of the handle flush with the front. Next, slot a piece of 1/8" plywood and slip it over the cable, forcing the cable into the plywood groove, and epoxy this to the front of the handle. Smear epoxy everywhere except on the cable or its groove, fill the slot on the front piece and carve to a pleasing shape. Duplicate these efforts on the other end of the handle. If you were careful with the epoxy, the modified handle will still be adjustable.

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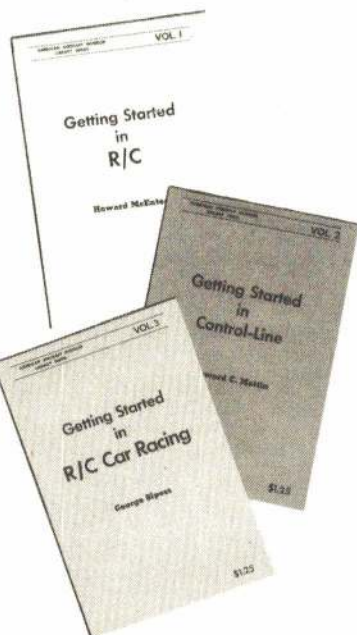


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times. Bob Wilder found that most fuel line filters make dandy one-way ball checks—simply drop a ball bearing into them. Leave the screen in place to insure full flow—one way.

Lava Soap For Lapping: Speed flier Phill Bussell suggested last year that I try Lava soap when I questioned him about lapping compound grits. I have used Lava for a year now, lapping pistons, rings, sleeves, heads and etc. and I am delighted with the results. It's perfect for the novice because it's readily available, cheap, and cuts well (if a little slowly), so that you are unlikely to damage the engine by removing too much metal. Use with water only. When dry, it is much too abrasive.

## LOWE ON RC

(Continued from page 26)

does it easily while running in the step, and he refuses to weathercock at an idle. Many other planes work in the opposite way and will trip over the tip of the outside float. Try to keep the wind from getting under the tail or upwind wing. Make the widest possible turn while running on the step."

I can't even comment on the validity of what he says, but it sounds good. This is a facet of the hobby that I haven't sampled yet but hope to some day.

Recap: In reference to the previous subject, have you recently stopped to think of the RC aircraft modeling categories available? No? Let's enumerate: (1) Sport flying; (2) Pattern—or stunt or aerobatics; (3) Racing: Formula 1/pylon, Formula 11/pylon; FAI/pylon, 1/4 Midget/pylon; open/pylon; (4) Scale: AMA Scale (slowing down), Stand Off Scale (growing like mad!); (5) Hydro? (6) Helicopters (only barely begun); (7) Fun fly (competition—loops, rolls, spins); Other possibilities needing development—autogyro, lighter than air, ornithopters, jet power, vertical takeoff and landing designs other helicopters (how about an XC-141?), electric power.

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I'm sure that other categories could be added, but there is surely something for everyone, right?

Building Tip: Most of you hot shots are now using retracts—how do you cut out your wheel wells? I presently use a hot wire which is more or less successful. Here's a technique first suggested in the Diablo Valley Radio Controller Newsletter "Pattern Patter": Take an empty 8-oz. Hobbypoxy can and cut it off with a hacksaw. It doesn't have to be a straight cut. Use your hand to hold the can, rotate it while pressing down and, presto—a beautiful round hole and you're ready to apply the sheeting to the edge. Simple, eh?

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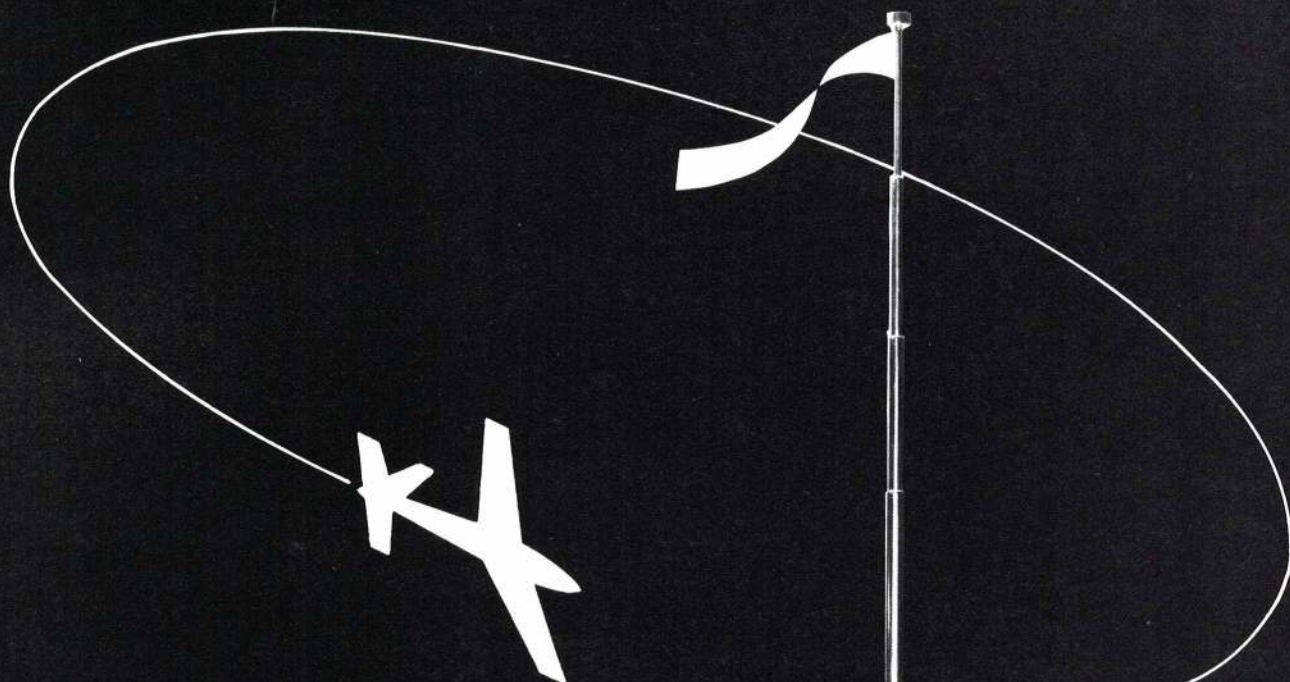
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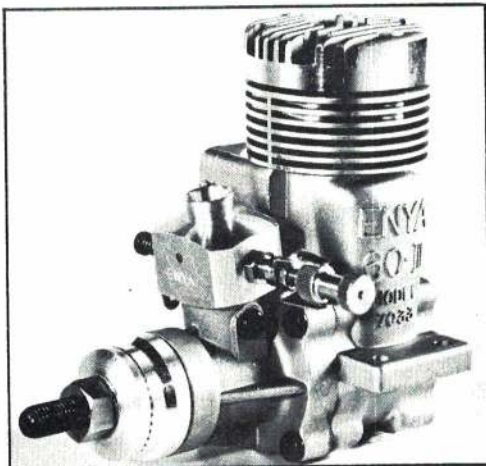
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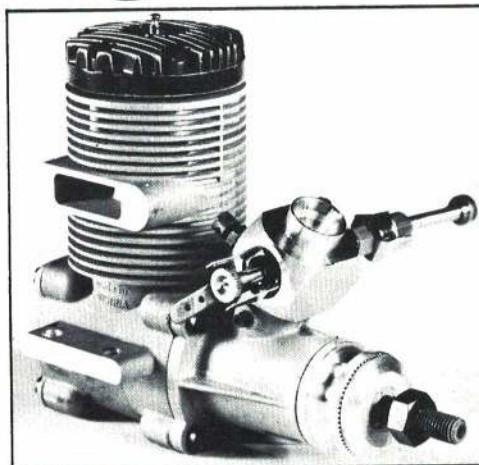
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